

The Magazine of Metalworking and Metalproducing

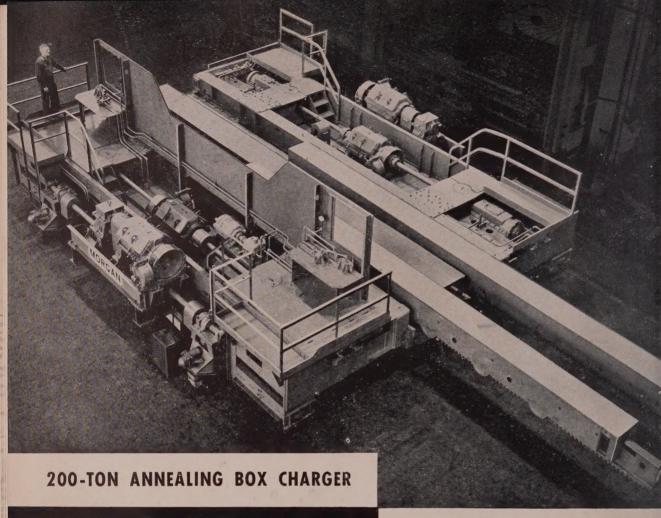
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Nothing Rolls Like a Ball

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Behind the Scenes ...

Radio Column

If you happen to be in a territory where you can listen to WWJ Detroit at 7:30 p.m. Tuesdays, you might tune in tomorrow night, Feb. 8, and listen to a skit featuring Mark Adams. It was inspired by one of our editorials, which explains our interest. But beyond that, it's a new and different kind of horror story-which is unfortunately getting uncomfortably close to us all. The editorial, "Welfare State" (Jan. 17 issue) questions the amount of taxes and controls people can stand before they give up completely and permit the entry of a "police state". The program is well written, and if you can catch it, it will give you something to think about.

Half Century Back

A half century back brings us to Vol. 32, No. 6. We note the front cover carries 24 advertisers, only two of whom are still in business under the same name, a few more still operating under slightly different names, but most of them totally unfamiliar today. In the news section, the big item was that during the past week. all ore sales for the year to come had been contemplated. "In one whirlwind week", says the Cleveland editor, "millions of direct sales were made" which will account for the total production of 1899, some 15 million tons. It is noted that some of the sales were made to Eastern interests by means of long distance telephone, the market having opened and closed so fast that they had no time to get to Cleveland.

New Chart

The editors tell us that this week's book carries a new and different kind of flow chart of the steel industry. This one not only shows direction, it shows tonnage. Our Pittsburgh editor, Joe Sullivan, is responsible for this one, and it's a good job. You like it? We have a few extra copies on hand for distribution.

Ore Is Scrapped

Sharp-eyed reader Walter Carroll of Republic notes that we have eliminated the Great Lakes ore fleet, closed all mines and rendered useless the millions of tons of iron ore which are now gracing the lower lake ports and surrounding the nation's blast furnaces. He deduces these amazing statements from a couple of figures

we showed in our recent article on scrap, prepared by E. C. Barringer, of the Institute of Scrap Iron & Steel. Ed, who used to be the managing editor of this magazine, is one of the nation's top scrap experts. We asked him Mr. Carroll's question, which showed that blast furnaces are currently being charged with 50.8% home scrap and 49.2% purchased scrap. That adds to 100% and leaves little room for ore in the furnace. Mr. B. was not confused, however. He looks for a great future in the iron ore business, doesn't expect his colleagues in the scrap industry to replace the ore mines of Lake Superior, regardless of how low the skidding scrap market

Hot Subject, Part IV

That article, incidentally, was one of the current series on Fundamentals of Steelmaking. The present subject in that series is open hearth furnaces, and you'll find in this issue part four of L. F. Reinartz' treatment. Mr. Reinartz, we hasten to point out, is a very hot writer on that very hot subject.

Puzzle Corner

Well, seems as if lots of geometrical experts are to be found within the magic circle of our 205 readers. And, if any of you couldn't get the answer to that diagrammatic problem of two weeks back in one minute or less. you should all (pardon the expression) hang. It was, of course, 22 inches, and as M. Florian G. Leroux of Quebec pointed out, the dimension BE was put in there only to fool people. Of course we always have perfectionists like our cousin Etaoin of Youngstown, who claims that there was no proof showing ABCD to be a rectangle, but we consider that of minor import among the greater social impact of the whole, to lapse into bureaucratic nonsense for a moment. We'll continue our round of easy puzzles with this one which is designed to be started after working hours. If you'll start working this at 5 p. m., you can then tell us the first time at which the hands will coincide; the first time that they'll form a right angle; at what time within the next half hour the hands will make a 30 degree angle and how much later than that will they first form a 60 degree angle.

Shrollu

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February 7, 1949

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COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co.



Headquarters for BRASS, BRONZE and COPPER

Cold Heading for Precision and Economy Silicon Bronzes Ideal for This Process

Improved cold heading machines today allow mass production of parts of great strength and precision with minimum material waste and labor costs. These new machines, products of a continued effort to conserve material and reduce manufacturing costs, are claimed to have greater rigidity and accuracy. Increased versatility of such equipment opens a range of work that seems limited only by the ingenuity of the die designer, and the ability of cold heading wire to flow to the desired shapes.

With softer metals, this is no problem. Where the finished part must develop strength of the order of 100,000 psi, however, an unusual combination of ductility and strength is necessary. No mean order, such requirements have been anticipated in non-ferrous metallurgical research.

Bridgeport silicon bronzes, for example, offer the manufacturer high strength in the hard drawn condition combined with remarkable malleability. When properly made from Bridgeport's Silicon Bronze 609, cold upset items do not require heat treatment to relieve stresses. Finished parts are exceptionally strong, resistant to wear and fatigue and free from stress corrosion cracking.

High Strength Fasteners

The most common application is the manufacture of screw products, such as cap and machine screws, bolts, nuts, and components for split bolt connectors. Hard drawn silicon bronze wire with a tensile strength ranging from approximately 75,000 to 90,000 psi is cold upset without intermediate annealing operations. Threading is generally done by the cold rolling process. Large headed bolts averaging over 100,000 psi are common for most sizes. This value is remarkably high as compared to low carbon steel, and ex-

plains the wide acceptance of non-rusting high strength silicon bronzes for such engineering applications.

The versatility of modern cold-heading machines, and the variety of alloys available, make possible production of a wide range of parts. They may range in sizes from tiny rivets to large bolts. Among other items are valve stems, radiator tubes, segment gears and innumerable others. The accompanying photograph illustrates but a few of the many thousands of items that are made.

Economy of Manufacture

In cold heading, high production rates are achieved easily. No extra stock need be provided, thus saving material by reducing trim scrap. Threads can be cold rolled, saving machining time as well as scrap loss. Virtually all the metal is used, and the finished cold headed part is often more accurate and stronger than a comparable machined part.

Obviously, quality of the finished part depends as much upon the wire or rod alloy as the machines. Surface imperfections, for example, are magnified greatly by the deformation involved in upsetting large heads. Material with the proper ductility, surface and temper is vital to insure uniform distribution of stock in the finished part and minimum of scrap from breaks in the surface. This is necessary whether head and shank are concentric or offset. Heading wire, therefore, must be more carefully processed from casting to finished size than wire used for other applications.

Aside from silicon bronzes, brass wire alloys are widely used for the manufacture of the many varieties of regular and special screws used in industry, and especially for electrical wiring devices and appliances, as well as for rivets, truck tire valves, valve stems, etc. Brass is an excellent base for lasting and attractive plated finishes, such as nickel and chromium as well as gold and silver for decorative purposes.

The manufacturer who wants to gain the full quality and economy benefits from this method of fabrication can get much help from our laboratories at Bridgeport and Indianapolis. Bridgeport makes a specialty of supplying wire and rod of the proper temper, surface finish and composition for cold heading operations. We will gladly help in the selection of the alloy best suited to specific needs.



Bridgeport makes many cold heading alloys in wire and rod form of the temper, finish and composition needed for high quality and economy of production.

Standard Cold Heading Alloys

A number of alloys of special physical and chemical properties have been developed to meet cold heading needs. Below 5%" in diameter, these are generally supplied in coiled material; above that dimension, in rod, to eliminate severe straightening operations.

Silicon Bronze 609—(Approx. 98% copper, 2% silicon). Especially resistant to stress corrosion cracking. Exceptionally malleable even in hard-drawn condition. Tensile strengths of finished bolts average 100,000 psi. Fine for outdoor use in pole line hardware, wire and cable clamps, water meter bolts and nuts, marine hardware, etc.

Silicon Bronze 609—(Approx. 98% copcopper, 1.4% tin, and 1% silicon). Similar in physical properties to alloy #609. Resists season cracking and sea water corrosion.

Phono-Electric 840 – (Approx. 98.6% copper, 1.4% tin). Electrical conductivity approximately 40% that of pure copper. Very malleable—stronger than copper. For pole line hardware and electrical parts where strength, toughness, resistance to weathering and good electrical conductivity are needed.

(Continued on Page 2, Col. 2)



These unusual jobs are produced on two-blow headers. Off-center shapes, odd shapes, and parts requiring uneven distribution of stock and slots are possible on this type of equipment. Courtesy National Machinery Co., Tiffin, Ohio.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, Research Chemist of the Bridgeport Brass Company.

Galvanic Corrosion in Salt Water

Satisfactory Galvanic Couples (Continued)

Silicon bronze bolts used to fasten together carbon steel sections exposed to sea water have led to no measurable increase in corrosion of the steel. Similarly, silicon bronze brazed joints (small area) in relatively large carbon steel sections are also satisfactory.

Silver brazed joints are widely used for joining copper and copper alloy tubing and piping for use in sea water. The results have been uniformly satisfactory.

Silicon bronze welds (made by gas and carbon arc) joining deoxidized copper, red brass, silicon bronze, etc., also show no tendency toward increased corrosion due to the galvanic effect in sea water.

Protective Galvanic Couples Protection by Solder

Coatings of 60 Lead – 40 Tin alloys (soft solder) are commonly applied to copper piping for protection against flowing sea water. It has been reported by Pomfret and Mosher¹ that wiped coatings of solder on copper give considerable protection at low water velocities but *not* at high velocities.

Some years ago it was thought that a dipped tin coating applied to copper or brass condenser tubing would increase the resistance to corrosion from sea water. Experience has shown that such coating is ineffective and this practice has been largely discontinued.

Rupture of the "tin" or solder coating or pinholes in the coating will lead to accelerated corrosion pitting of the copper in rapidly flowing sea water. Here the coating reverses its polarity with respect to the copper and the resulting active galvanic couple consists of a large surface area of a slightly more noble coating and a small anodic area of copper.

Protection by Zinc

Hot dipped (galvanized) and sprayed zinc coatings on steel give protection to the steel as long as some zinc remains. Zinc plates have also been used to protect steel galvanically, etc. The success of this procedure depends upon continuous dissolution of the zinc and a good electrical contact with the steel. Since a high resistance coating forms on the zinc anode which reduces its effectiveness, frequent cleaning of the zinc is necessary.

¹R. A. Pomfret and L. M. Mosher, Corrosion (N.A.C.E.) 4, 5, 227-43 (1948).

COLD HEADING

(Continued from Page 1, Col. 3)

High Brass 16—(Approx. 65% copper, 35% zinc). Very malleable and ductile, most popular of heading alloys. For machine, wood and cap screws, solid and hollow rivets, special fasteners.

70-30 Brass 37—(Approx. 70% copper, 30% zinc). Slightly more ductile, used for making exceptionally large heads and certain types of hollow rivets.

Low Brass 5 — (Approx. 80% copper, 20% zinc). Very malleable, more resistant to stress corrosion cracking and general corrosion. Light golden color—popular for jewelry findings, parts with large upset heads.

Red Brass 85 — (Approx. 85% copper, 15% zinc), Very malleable. Good corrosion resistance, Rich golden color. For ornamental jewelry, special rivets and fastenings for vanity cases, lipstick holders.

Commercial Bronze 25—(Approx. 90% copper, 10% zinc). Bronze color, resists season cracking. For fastenings used in outdoor constructions,

Naval Brass 45—(Approx. 60% copper, 0.75% tin, balance zinc). Used for cold heading bolts to U. S. Navy requirements.

Low Leaded Brass 41—(Approx. 63% copper, 0.75% lead, balance zinc). Used where cold heading is followed by drilling, reaming, threading, slotting, and tapping machine operations.

Light Leaded Brass 43—(Approx. 65% copper, 0.3% lead, balance zinc). For operations requiring good cold heading with light machining.



Bridgeport also offers many other alloys in different forms suitable to other fabrication techniques of modern industry.

For fast, precision screw machine production with maximum economy, for example, there are a number of excellent alloys in rod form. These include Duronze* III Aluminum Bronze for exacting engineering applications; High Speed Free-Turning Brass; Leaded Commercial Bronze; Naval Brass and Leaded Naval Brass.

Other mill products include brass, bronze, copper sheet and strip for drawing and stamping; condenser tubing in a wide range of alloys and Duplex tubing; bronze welding rod for fabrication and repairs.

Modern mills in Bridgeport, Conn., and Indianapolis, Ind., with a staff of experienced laboratory and production men, are ready to help you with your metal problems.

*Reg. U.S. Pat. Off.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Synthetic Enamel Strippers are said to be especially suitable to remove clear synthetic enamels from highly polished surfaces such as brass, gold plate and silver. Nontarnishing, need not be followed by rinse.

Multiple Fuse contains five fuse links which can be rotated in shell to bring unused link into circuit when one link blows. Inner fuse link unit is replaceable.

No. 909

New Caulking Material is said to adhere tightly to brass, aluminum, steel, plastics and seal openings and cracks at temperatures between—65° and 500° F.

No. 310

Two New Cleaning Compounds, supplied as powders for mixture in water in varying proportions depending upon work, are said to clean buffing compounds, oils, dirt from work prior to electroplating. Solution can be used with direct-reverse current cleaning, soaktank operations followed by reverse current, anodic cleaning and cathodic cleaning. No. 911

Die Casting Machine has a cold-chamber hand-ladling head to handle brass, aluminum and magnesium that is interchangeable with a gooseneck plunger and melting pot for zinc, lead and tin. 800-ton pressure, die space 40" to 25" between tiebars, platen movement up to 17½".

New Solderless Terminal, with contact area 1/4" x 3/8", combines flat-blade terminal for wiring and female contact member with spring that maintains contact pressure. A dimple and hole prevent accidental disconnect. No. 913

Wire Fatigue Testing Machine is said to provide information helpful in controlling wire drawing processes, wire acceptance on basis of fatigue data, predicting wire life in service and determination of safety factors in design. Wire capacity from 0.0005" to 0.030" diameter.

New Metal Forming Process uses dies heated by electric current to neck, seal and upset cylindrical work, which is fed to die and rotated by mechanical and hydraulic pressure. Experimentally, machine has necked $3\frac{1}{2}$ " tube with $\frac{1}{3}$ " wall in 6 seconds. Several capacities from $\frac{3}{4}$ " to 16" diameter. Availability in several months. No. 915

Wire-Tying Tool of cast bronze is reported to tighten and tie wire ends in all sizes up to No. 7 in as little as 30 seconds. No. 916

Abrasion Testing Machine is said to be useful for testing the abrasion resistance of all types of surface finishes, including electroplate, porcelain enamel, organic coatings, insulating tapes, etc.

No. 917

Electronic Micrometer makes possible continuous measurements of outside diameter of wire, thread, tubing, rod, etc., and the edge-to-edge dimension of strip stock, etc., at high speed, it is claimed.

No. 918

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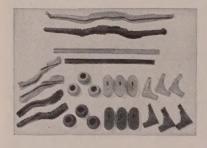
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How The Wheelabrator® Removes Mica From Rubber—

An interesting application of "Wheelabrator" cleaning is found in an Indiana rubber company. This company manufactures molded sponge rubber products for seat cushions, auto door gaskets, etc.

Below-Typical molded parts 'before and after" Wheelabrating.



In the production of these articles, powdered mica is sprinkled in the mold to prevent sticking and to help the rubber to form without defects.

the rubber to form without defects.

A problem arose from the fact that the mica becomes imbedded in the surface of the rubber, where it spoils the appearance of the product as well as making cementing difficult.

For years, dry tumbling followed by a liquid dye dip was used to remove most of the mica and return the rubber to a natural black color. However, this was a messy, slow, costly procedure.

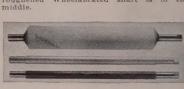
A series of tests in the "Wheelabrator" laboratory showed the feasibility of airless blasting to remove this mica. Now this single operation removes the mica, completely exposing the natural rubber, and leaves the surface in excellent condition for cementing.

When the makers of America's leading washer-wringers turned to "Wheelabrator" airless blast cleaning in the preparation of wringer roll shafts, they found a two-fold advantage: First, they eliminated the disagreeable working conditions attendant upon the former method of washing and pickling. Second, they found the blasted finish produced by the "Wheelabrator" pro-

vided the perfect bond-surface for applying the rubber.

Now, shafts are consistently better and more uniform. Furthermore, maintenance, which was frequent and costly with the old method used, was materially reduced.

Left—The 27" x 36" "Wheelabrator" Tumblast which provided better rubber adhesion at lower cost. Below—Three stages in the production of a wringer roll. The uniformly roughened Wheelabrated shaft is in the middle



Tools Last 10 Times Longer

Surprising evidence of the thoroughness of "Wheelabrator" cleaning is found in the cost records of machine departments. In the Buffalo Forge Co., for example, only 200 cut gears could be machined before cutting tools required resharpening. Now, a "Wheelabrator" removes the scale from cut gears so completely that from 1,500 to 2,000 may be run without changing tools. In this installation, a single 48" x 42" Wheelabrator Tumblast replaced 10 tumbling barrels, and is reported to be doing a much better job in half the time.

Steel Draws Deeper When Wheelabrated

A Pennsylvania pressed steel company has found that Wheelabrating steel sheets before drawing has improved their production process. The effect of the Wheelabrating is to give the sheets an "orange-peel" surface which enables them to hold lubricants and drawing compound far better. This lessens die contact and eliminates seizing and scarring, as well as saving considerable die maintenance.

Porosity Eliminated In Aluminum Die Casting

The bug-a-boo of surface porosity in aluminum die castings is eliminated by the "Wheelabrator" shot peening process. In this process the structure of the surface layer of the casting is actually changed. As a result, minute pores, cracks, and surface fissures are closed up under the impact of the shot.

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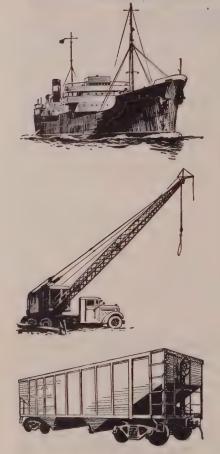
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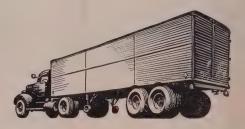
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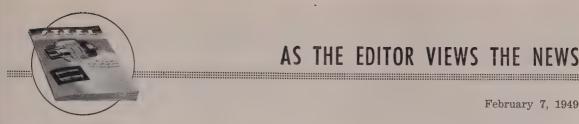






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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET, NEW YORK 5, N. Y.



AS THE EDITOR VIEWS THE

February 7, 1949

You Can Help!

Although almost every careful analysis of the votes cast in the Nov. 2 election shows that Mr. Truman owes his victory more to the farm vote and to the over-confidence of his opponent's party than to the vote of labor, the President seems to be determined to pay labor liberally for its support by acquiescing to many of its demands in connection with the new labor relations bill.

To date the attitude of the President, considered in conjunction with the testimony of Attorney General Clark and Secretary of Labor Tobin, indicates that the administration is willing to yield to the demands of labor unions even to the extent of abandoning in the new labor law certain safeguards in the Taft-Hartley Act which the President himself used on a number of occasions to meet national emergencies. If, as it appears, the President is willing to forego these safeguards, among which is the authority of the President to seek injunctions against strikes that would endanger the welfare of the nation, then he is plainly putting his fancied debt to labor ahead of his responsibility to the public.

Apparently members of the opposition party are alert to this danger. In hearings on the new labor bill in the Senate last week, a number of Republican senators declared that they will insist that proper safeguards be spelled out in the pending legislation in unequivocal terms. Senator Morse stated flatly Thursday morning that the administration's labor bill-lacking these safeguards-"hasn't a ghost of a chance of getting through the Senate."

All fair-minded people will hope that the Oregon senator is right. However, the labor unions are going all out to get a one-sided 'abor law in their favor. They are asking their members to bombard members of Congress with demands for this one-sided law. Their campaign to this end is in full swing.

It would help representatives and senators who are fighting for a just law tremendously if they could receive strong support from individuals who want a law that is fair to employers and to the public, as well as to employees. Why not write a letter of encouragement to those who are working for a sound law!

TENSION IS ABATING: Almost every day furnishes fresh evidence that the tight situation in steel supply is easing appreciably. A quick check by this publication's editors of representative steel consumers shows that most metalworking companies are able to get quicker deliveries from mill or from warehouse than was possible six months ago. Their inventories are larger, in terms of days of operation, than they were last July. In a few cases, this condition is attributable to curtailed operations but in the majority of instances it is due to better supply.

A specific example of the easier situation is afforded by the buyers of sheets and strip, which products have been the cause of most of the headaches on the part of steel customers throughout the postwar period. Six months ago buyers, on the average, had to wait 112 days for mill deliveries on these products. Today the average waiting period is 86 days.

Naturally the easing varies according to prod-

(OVER)

ucts. Much of the plate output is earmarked for priorities under the voluntary allocation programs. As a result, heavy plates still are scarce for consumers who have no priorities. Cold-finished bars still are difficult to obtain. Rolled aluminum products, relatively scarce today promise to be in much better supply soon. Merchant pig iron is in improved supply, due to a reduction in the melt of foundries.

All in all, this quick check reflects the shakedown that is occurring in many sectors of the metalworking industry. It calls for caution but not alarm. In a few weeks, one may be able to diagnose these easements at their true value.

-p. 61

JUSTICES MAY CLARIFY: Last week the Supreme Court announced that it would review a lower court decision upholding a Federal Trade Commission order banning basing point pricing in the rigid steel conduit industry. This announcement could turn out to be very important.

Up to the time of this announcement, it was believed that relief from the confusion attending several Supreme Court decisions could come only from Congressional action. The high court's announcement may indicate that it recognizes its responsibility, as the creator of the confusion, for the necessary clarification. If this interpretation is correct, then the Supreme Court justices really can perform a welcome service if they can do on their own initiative what generally has been believed to be the responsibility of the lawmakers. Industry will watch developments with keen interest.

—p. 63

DANGEROUS PROPOSAL: Maritime Commission is seeking authority to install surplus Navy drydocks at its "mothball" fleet sites to permit scraping and painting the bottoms of 2342 merchant vessels and to determine the extent of repairs needed on them. Actual repairs, if needed, would be done in private yards.

Shipyard operators object to this proposal because it would give the government entry into a field that should be reserved for the private yards to help them maintain facilities in a state of full efficiency to meet national emergencies.

Perhaps some money could be saved by the Maritime Commission's plan, but if it resulted in a deterioration or abandonment of some of the facilities of private yards, then the saving would be trifling compared to the high cost of restoring the facilities at a later date. Also, this is a time when the government should be retreating from, instead of advancing farther into, the field of private business.

—p. 68

CHEAPER BY THE POUND: Every now and then a bit of news appears which enables one to refresh his memory as to the amount of metal in a standard automobile. The current Chevrolet 4-door sedan, weighing 3150 pounds, contains 2673 pounds of iron and steel, 95 pounds of other metals and 382 pounds of non-metallic materials.

Automobile manufacturers like to compare the cost per pound of their product with that of other manufactured items. The present average for automobiles is about 50 cents a pound, compared with \$4.50 for vacuum cleaners, \$5 for typewriters, \$4 for electric toasters and 76 cents for road rollers.

It takes a lot of know how, organization, money, equipment, volume and many other things to get the per-pound cost of a product as complicated as a motor car down to the price you would pay for a pound of wieners. —p. 76

DEEP STUFF FOR LAYMAN: To persons who are closely identified with the steel industry but who ordinarily are not required to know very much about the metallurgical aspects of steelmaking, we strongly recommend reading of the articles by L. F. Reinartz on the production of open hearth steel.

In the current installment he compares the acid and basic open hearth processes in language that any layman can understand and then plunges into a detailed description of the various steps in the operation of a basic open hearth from the start of the charge to the tapping of the heat.

This description could have been couched in technical terms that would have confounded the non-technical reader, but Mr. Reinartz has avoided this. His text is easy to understand. After reading the current installment, you will understand what the open hearth personnel has had to do to give you a steel suitable for your purpose—structural, deep drawing or what not.

—р. 106

E. C. Shaner
EDITOR-IN-CHIEF



Why Koppers Scuttled the Steamers

Like hundreds of other big industrial companies, Koppers had been operating a fleet of steam powered locomotive cranes that were many, many years old. Taking a shrewd look at costs, they found such facts as these:

A steamer burns about a ton of coal a day—say \$9 worth; a new American Diesel burns \$1.80 worth of oil, to do more work, faster! A steamer needs a boiler washout every Sunday—with labor at double time; an American Diesel doesn't. A steamer needs an operator and a fireman; an American Diesel needs only the operator. A steamer needs to be fired up in the morning, banked at night—on overtime; an American Diesel doesn't.

As to speed, ease of operation, design features and maintenance costs, the differences between old steam cranes and new American Diesels were even more dramatic, of course. But Koppers could have disregarded these entirely. They could well have afforded to buy a fleet of new American Diesels with the savings to be made on operating costs alone. And the order was accordingly written.

If antique cranes are eating holes in your budget, why not make the same check-up, and comparison? Just mail the coupon below, and we'll send you interesting literature describing AMERICAN Locomotive Cranes—gasoline powered, diesel powered, and the great DIESELECTRIC.

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News Summary

STEEL SUPPLY EASES— Metalworking companies are getting quicker deliveries on steel products than they were last summer, a survey of steel users (p. 61) discloses. Inventories generally are larger than they were six months ago and some buyers are becoming more cautious about accumulating heavy stocks in the face of softening demand for their products. Pig iron supplies to foundries are substantially improved due largely to a reduction in casting operations. Rolled aluminum products recently have been in tight supply, but producers expect this situation will improve in the next few weeks.

ALLOCATIONS EXTENDED—Congress has authorized extension of the voluntary allocations program for steel and certain other scarce materials to Sept. 30, assuring no hiatus in the allotment plan when the original law expires Mar. 1. Several new programs (p. 63) now are being studied, including ECA programs, assistance for municipalities, and additional help for housing and national security plans. Fifteen programs now in effect or soon to become effective allocate 559,790 tons of steel monthly. Continuation of several of these, however, is in question.

SLUMP IN STOVES— Uncertain as to whether the current lag in sales of household stoves is merely seasonal or part of a more serious economic readjustment, stovemakers are considering ways and means of bolstering their operations (p. 64). Several manufacturers are planning to turn to plainer models, which can be manufactured and sold at lower prices, to stimulate sales.

MANGANESE ORE—Where could the United States turn to obtain manganese should Russia, now a major supplier, cut off shipments to this country? Steel companies, which now require 1.5 million tons annually, are looking toward developing improved sources in India, Brazil and other potential suppliers (p. 65). While the problem is receiving increasing attention, steel men point out that we were able to get along without Russian manganese during the war, and probably can develop adequate sources elsewhere.

ANTITRUST MORATORIUM—A two-year holiday on antitrust prosecutions against "individual good faith delivered-price systems and freight absorption practices" has been proposed by Rep. Francis E. Walter (Dem., Pa.). His bill would not apply to cases now in the courts but would prohibit new cases against freight absorption in the absence of conspiracy until Feb. 1, 1951, to permit clarification of various phases of the pricing problems.

WESTERN EXPANSION CONTINUES—Steel ingot capacity in the western states will be increased to 4.5 million tons by 1950, an advance of 700,000 tons over 1948, but still will fall short of the area's indicated needs (p. 67). Current capacity is four times the 1940 total.

FOREIGN—Electric power production in Europe has increased 50 per cent above prewar output (p. 71), but a shortage still exists in many countries. Dismantlings and reparations commitments contribute to the power shortage in western Germany and staggered shifts are necessary in some industrial plants. Britain needs large new facilities to bring power output up to needs. In France, the coal strike and other labor disturbances have aggravated the shortage.

HERE AND THERE IN INDUSTRY— Colorado Fuel & Iron Corp. is expanding its wire mill at Pueblo to handle the greater output of its new rod mill (p. 78)... Half a million persons visited 60 steel plants holding open house during 1948 (p. 79)... Chrysler is swinging into its changeover to 1949 models (p. 75), should resume full production by early March... Eighty million appliances for farm and home, worth \$5 billion and requiring 25 million electric motors, are sold annually (p. 66).

59



His Signature -Your Alloy Protection

This Ryerson alloy inspector's signature completes a triple play for your protection—spark tester to laboratory metallurgist to inspector.

First the spark tester checks the spark pattern to verify the steel's analysis. Then the metallurgist tests it for hardenability in the Ryerson laboratory. Finally, the inspector checks the steel when ready for shipment and certifies with his signature that its type, size, finish, condition, color marking and heat identification exactly meet specifications of the order.

The inspector's signature also means that the Ryerson Alloy Certificate sent with the steel correctly charts hardenability for the particular bars shipped. This Certificate proves that the steel will meet performance requirements—enabling you to

buy on the basis of hardenability with complete safety. Heat treating? The Certificate guides you to quick, accurate results.

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RYERSON STEEL



Buyers Find Steel Supplies Easier

Metalworking companies say inventories are larger and deliveries more prompt than last summer. Plates are exception. Aluminum to improve. Pig iron supplies better

METALWORKING companies are getting quicker deliveries from mills and warehouses on practically all steel products than they were six months ago.

Steel consumers' inventories are larger, in days of operation, than they were last July.

To obtain mill delivery of sheets and strip, the tightest of steel products during most of the postwar period, today requires an average of 86 days. Six months ago, 112 days were required.

These signs of easing in the steel market are reported to STEEL by a large number of companies engaged in a wide variety of metalworking operations and representing every section of the country.

The picture of larger inventories and easier deliveries is not without its dark spots. A few consumers say steel is about as difficult to obtain as it ever has been. Several complain they still are forced to buy in the gray market at premium prices. Others report their receipts of steel are inadequate to support full operations. But a majority of steel users find they are getting shipments more promptly and that steel supply is not

nearly as serious a problem as it was last summer.

Sheet-Strip Easier — Most pronounced improvement is indicated in the light flat-rolled products. More than 6 out of 10 users report larger inventories and quicker deliveries on hot and cold-rolled sheet and strip and on galvanized sheets. Only 3 out of 20 report lower stocks in these items. No user reports slower deliveries.

About 10 per cent of the companies reporting an increase in inventories attributed it to reduced operations, which have permitted stocks to accumulate. A few said they have been reducing steel inventories voluntarily as deliveries improve.

Plates Are Exception—Steel plates are an exception to the general picture and many users say material ¼-inch and heavier is extremely difficult to obtain. Stocks are lower than last July. This is explained by the large percentage of plate production which is being channeled into the voluntary allocation programs.

Bars have improved relatively less than the light flat-rolled products. Cold-finished bars in particular are reported scarce and stocks of coldfinished allow material are lower than last July. Considerable spottiness is noted in consumers' reports on bars. Some sizes and grades are scarce in some localities, while others are fairly plentiful. The slight improvement in bars is partially explained by the fact that these products were relatively less critical last summer than were sheet, strip, plate and tubular goods.

Structural shapes also present a spotty picture, with some users reporting a substantial easing in supply and others contending shapes are just as difficult to obtain as ever. Many of the latter, however, are looking for small and special sizes. On the average, 6 out of 10 users of shapes report deliveries have improved and 4 of 10 have larger stocks.

Aluminum Outlook Promising

WHILE reports from users indicate that aluminum rolled and extruded products are tight at the moment due to decreased allocations in first quarter, the situation is expected to ease appreciably over the next few months In fact, producers expect such items as aluminum sheet to be on a fairly current delivery basis by May and that order backlogs in general will be down to normal by June 30.

The aluminum industry, both in this country and Canada, has been plagued by shortages of hydroelectric power for its reduction plants but the spring thaws promise to bring relief and deliveries of aluminum products will improve rapidly.

Copper, Brass Mill Products

SUPPLIES of copper and brass mill products are reported to be fairly comfortable. Four out of 10 users say deliveries are more prompt and more than 9 out 10 have stocks at least as large as last July.

Primary copper is in short supply. Government stockpiling and the loss of production at strike-bound mines are aggravating the scarcity.

Pig Iron Easier

SLOWING foundry operations have taken the pinch off merchant pig iron. Six out of ten companies engaging in casting operations report pig iron stocks are larger than they were last summer. Nearly half say they can get earlier deliveries and the remainder say deliveries are unchanged. Pig iron generally has been shipped on a regular allotment basis

METALWORKING COMPANIES REPORT ON MATERIALS				
COMPARISON OF INVENTORIES & DELIVERIES TODAY WITH SIX MONTHS AGO	INVENTORIES (CONSUMERS' STOCKS)	DELIVERIES (FROM MILLS, WAREHOUSES)		
STEEL PRODUCTS	Larger 44% Smaller 22% About Same 34%	Quicker 54% Slower 4% About Same 42%		
ALUMINUM ROLLED PRODUCTS	Larger 25% Smaller 50% About Same 25%	Quicker 13% Slower 50% About Same 37%		
COPPER & BRASS MILL PRODUCTS	Larger 17% Smaller 9% About Same 74%	Quicker 43% Slower 9% About Same 48%		
PIG IRON	Larger 57% Smaller 9% About Same 34%	Quicker		

STEEL USERS REPORT ON SUPPLY POSITION				
Type of Product	INVENTORIES (CONSUMERS' STOCKS)	DELIVERIES (FROM MILLS, WAREHOUSES)		
HOT-ROLLED SHEET-STRIP	Larger	Quicker		
COLD-ROLLED SHEET-STRIP	Larger	Quicker		
GALVANIZED SHEETS	Larger	Quicker		
HOT-ROLLED CARBON BARS	Larger 39% Smaller 26% About Same 35%	Quicker 53% Slower 3% About Same 44%		
COLD-FINISHED CARBON BARS	Larger 20% Smaller 16% About Same 64%	Quicker 41% Slower 9% About Same 50%		
HOT-ROLLED ALLOY BARS	Larger 30% Smaller 30% About Same 40%	Quicker		
COLD-FINISHED ALLOY BARS	Larger 11% Smaller 33% About Same 56%	Quicker 30% Slower 20% About Same 50%		
STEEL PLATES	Larger 35% Smaller 39% About Same 26%	Quicker 45% Slower 10% About Same 45%		
STRUCTURAL SHAPES	Larger .40% Smaller .35% About Same .25%	Quicker 59% Slower 0 About Same 41%		
MANUFACTURERS :	Larger 25% Smaller 17% About Same 58%	Quicker 54% Slower 0 About Same 46%		
STEEL TUBING	Larger 44% Smaller 16% About Same 40%	Quicker .40% Slower .8% About Same .52%		

and even during the period of acute shortage the problem of users was not slow deliveries, but rather inadequate supply. A few foundries note that their stocks of pig iron are the largest on record.

Metalworking companies buying castings report that deliveries now are nearly on schedule, reflecting the easing in foundry operations.

As Buyers View Supply

COMMENTS by metalworking companies replying to STEEL'S questionnaire offer some interesting sidelights on the supply-demand picture. The majority of complaints about being forced to buy steel in the gray market now come from the Prairie states. An Iowa company wonders why it still is unable to obtain hotrolled sheets and galvanized material from either warehouses or mills, but must buy from gray marketers at premium prices. Another Iowa company says it is unable to buy steel for its own account, must depend on its customers to supply the material. A Kansas plant, however, says its prospects for obtaining an adequate supply of steel products are brighter and notes that gray market offerings are in better supply and are sharply reduced in price.

Metalworking companies buying from warehouses generally report they are obtaining a more satisfactory supply, although some exceptions are noted. A Chicago company says it can fill its requirements from warehouses easily. An Akron buyer is able to obtain sheets in the gages and specifications needed from his jobber. A Savannah, Ga., company finds no cause for complaint on the service offered by his warehouse suppliers. On the other hand, a Milwaukee firm says buying from warehouses still is a "hit-or-miss" proposition, that shopping around still is necessary to obtain types of material needed. And a Chicago company reports it is able to obtain only 10 per cent of its requirements for gavanized sheet and manufacturers'

Companies which are not beneficiaries of the voluntary allocations programs frequently compain that they are unable to obtain plates, especially in the heavier sizes.

Most often mentioned improvement is in hot and cold-rolled sheet supply. However, a number of companies still find such material difficult to obtain, particularly in the lighter gages and galvanized material. A Kentucky company says its steel supply situation is the most acute since the company has been in operation in that state. A Toledo manufacturer finds light sheets "still impossible to obtain." A Pennsylvania firm is receiving 50 tons a month, but needs 100 tons monthly.

On the improvement side, a downstate Illinois company says "steel deliveries are improving fast." Akron reports "steel, with the exception of plate, is much easier." A Baltimore company says "cold-rolled sheet has eased considerably in the past few weeks."

Opposes Tool Steel Tariff Cuts

A. T. GALBRAITH vice president, Crucible Steel Co. of America, New York, warns against further reductions in tariffs on tool steels.

Actually if the present import duty on tool steels were to be cut 50 per cent, as proposed in some quarters, "some producers of tool steel in this country would go out of business."

This would materially weaken the country's defenses, he emphasized, adding that a shutdown of any substantial segment of this industry could mean a period of anywhere from two to five years for re-instating previous production capacity.

Last year 90,000 tons of these steels were produced, against 210,300 in 1942.

Allocations Extended

Congress passes bill authorizing voluntary channeling of scarce products to Sept. 30

CONTINUATION of voluntary allocations of steel and certain other scarce materials until Sept. 30 was assured last week when both houses of Congress passed a measure providing for extension of the voluntary agreements program.

'The original law (P.L. 395) establishing the voluntary allocations program will expire Mar. 1.

14 Programs in Effect—Already in effect are 13 programs providing for the allocation of steel and one providing for the allocation of 102,525 tons of pig iron monthly for housing products. Two more steel allocation programs, covering a pipeline for Oak Ridge and farm-type grain storage bins, are in an advanced stage of development and will be placed in effect soon. The list of the steel allocation programs and the monthly tonnages provided are:

monthly tonnages provided a	16.
Freight cars	250,000
Atomic Energy Commission	22,265
Warm air heating equipment	31,622
Factory-made steel houses	9,835
Anthracite industry	2,570
Armed forces	102,505
Barges, towing vessels	25,000
Tank, oil field production	
equipment	16,530
NACA	1,926
Oil tankers	40,380
Merchant vessels	15,415
Mining machinery	26,400
Manganese ore cars	2,192
Oak Ridge pipeline	4,750
Farm-type grain storage	
bins	8,400

 now under study or in prospect. These cover such matters as the ECA programs, distressed municipalities requiring steel procurement assistance to meet public health and welfare needs, and possible additional requirements for housing and national security programs.

Consider Aluminum Allocation

WHEN Secretary of Commerce Charles Sawyer appeared before the House Banking & Currency Committee to recommend extension through Sept. 30 of the voluntary allocations program to provide a sufficient period to enable Congress to consider the kind of controls needed thereafter over scarce and critical materials, major interest was shown by the committee members in regard to metals not now covered by allocations.

After considerable discussion with reference to the aluminum supply-demand relationship, Mr. Sawyer agreed to undertake an immediate study to determine whether aluminum allocations agreements should be set up. But it was Mr. Sawyer's belief, apparently concurred in by committee members, that no allocations program will be needed in connection with copper, lead and zinc.

Production is increasing, and all of the money available to the Munitions Board for the purchase of copper, lead and zinc for stockpiling purposes now has been spent, Mr. Sawyer said. Unless Congress authorizes additional funds for stockpiling these metals, he said, the supply of them for purposes of consumption will be easier.

High Court To Rule on Pricing

HOPE was raised last week that confusion over the legality of basing point and similar pricing would be removed soon when the U. S. Supreme Court announced it would review a lower court decision upholding a Federal Trade Commission order banning basing point pricing in the rigid steel conduit industry.

In the cement case the Supreme Court held that the industry had violated the law by conspiring to fix prices through use of a basing point system and ruled that an FTC order banning use of the system be carried out. Language of the decision led to interpretation by many legal experts that all basing point sysems are illegal and that the only sure methof staying within the law was to sell on an f.o.b, mill basis.

Steel Conduit Order - The FTC order in the rigid steel conduit case was approved last August by the Seventh Circuit Court. The first part of the FTC complaint in this case charged the respondent companies with conspiracy to fix prices through use of the basing point pricing system. In the second part, the respondents were accused of violating the law by using a uniform delivered price system merely in the knowledge that other firms were using a similar system. In this part of the complaint conspiracy was not charged.

Companies appealing the lower court decision are General Electic Co., Youngstown Sheet & Tube Co., Republic Steel Corp., Triangle Conduit & Cable Co., Clayton Mark & Co., Enameled Metals Co., Fretz-Moon Tube Co. Inc., Laclede Steel Co., the M. B. Austin Co., National Electric Products Corp., Spang-Chalfant Inc., Steelduct Co. and several individuals.

In their application to the Supreme Court for review of the decision the respondents in the steel conduit case point out that the FTC order presents the question whether a seller of conduit may independently make use of a basing point method with the knowledge that other sellers are using the same method but with



FLOATING TUNNEL: This steel all-welded tube, 35 x 375 feet, is being floated 400 miles by water from Ingalls Shipbuilding Corp. at Pascagoula, Miss., to

Pasadena, Tex., where it will become a part of a vehicular tunnel under the Houston ship channel. Three other sections will be floated down in the same manner

out agreement, combination, conspiracy or discrimination in price.

Whether progress of pending clarifying legislation will be stalled by the possibility of an early judicial decision is uncertain. Testifying recently before the Senate Interstate Commerce Committee which is considering a bill introduced by Sen. Edwin C. Johnson (Dem., Colo.) to permit freight absorption where the method of pricing is not arrived at through conspiracy, Assistant Attorney General Bergson gave as one reason for opposition to the measure the fact the rigid steel conduit case was before the High Court and that its decision in this case might so clarify the issue there would be no need for legislation.

Holds FTC Usurps Powers

TREMENDOUS threat to the American free enterprise system and to the constitutional form of government is contained in the Federal Trade Commission's usurpation of duties of the legislative, judicial and executive branches through its "administrative interpretations." So declared Edward A. Zimmerman, Chicago, general counsel to Marquette Cement Mfg. Co., to members of the Steel Plate Fabricators Association at the Palmer House in Chicago, Jan. 28.

Giving the background to FTC's prolonged fight against delivered pricing in the cement and steel industries, Mr. Zimmerman pointed out that in supporting its charge of price discrimination by the cement industry FTC used as its definition of "price" the one which it unsuccessfully tried to have included in the Robinson-Patman Act-namely, that "price" is "the amount received by the vendor after deducting actual freight . . . " Price, Mr. Zimmerman asserted, is the sum for which goods are bought and sold in a market, and cost of transportation is fundamentally the same as cost of labor, cost of materials, etc., any one of which must necessarily be absorbed if a competitor's lower price is to be met.

The legislative problem now before Congress, he continued, is not whether sellers should be permitted to apply or absorb transportation costs, but rather "how industry may be freed from the unauthorized restrictions imposed upon competition by the trade commission and how a repetition of such confusion and chaos may be avoided by preventing the FTC from further tampering with the laws made by Congress and the freedoms of buyers and sellers."

The bill introduced by Sen. Edwin C. Johnson (Dem., Colo.), while

useful as a framework for development of a better and more complete plan to prevent "disruption of the American economy by the ill-judged acts of a power-hungry government bureau," actually would enlarge FTC's powers "far beyond anything it has ever before assumed," the attorney declared.

At the fabricators' two-day convention all officers were re-elected for the coming year. R. J. Ryan, John Nooter Boiler Works Co., St. Louis and H. D. Skyrm, General American Transportation Corp., Chicago, were named to the executive committee.

Lower Priced Stoves

Seen by makers of cooking ranges as possible means of combating current sales lag

PRODUCTION of lower priced lines of cook stoves is being looked to as a possible means of bolstering activity in the stovemaking industry, now experiencing a business let-up.

Stovemakers still are not sure whether the slump in demand is merely the return, after an eight-year absence, of seasonal factors or whether it is part of a broader economic adjustment and more than temporary. By the end of the first quarter they expect to know the answer.

In studying what adjustments they may have to make they don't see any possibility of making substantial price cuts on present lines of ranges, steel prices and labor rates being what they are. The alternative, it was pointed out, would be to turn to less deluxe lines that would involve lower costs.

Operations Curtailed - Meanwhile, the stovemakers have curtailed operations, the cuts ranging from reduced work weeks to severe lay-offs. In the Chicago area, one of the most prominent companies in the industry has pared its output more than 50 per cent. Stove plants in the St. Louis, and East St. Louis and Belleville, Ill., area have been forced to lav off large numbers of workers. In December, 18 stove plants and foundries in that district operated on a very limited basis and many were closed completely. One is still shut down. Some went temporarily into other types of manufacture to carry through an anticipated December-March slump. Whether a pickup will occur in March is a matter of considerable conjecture; many of the producers in the St. Louis-Belleville area fear it may not.

Workers Laid Off-Since Jan. 1

in that district about 200 workers have been laid off by Charter Oak Stove Co. After laying off another 280 employees recently, American Stove Co. had cut its force to 850, a drop of 1050 from October.

Stovemakers who believe today's slump is not especially alarming say the high rate of new home building continues to indicate a sizable market for new ranges, and furthermore, that features of the new models outmode stoves in many kitchens so that with proper sales effort a very substantial replacement market can be tapped. The less optimistic think that pentup demand brought about overexpansion and that the stove market is not actually as large as the industry's present capacity.

As a result of the business contraction there is less demand from stovemakers for gray market, conversion and even warehouse steel. In scattered instances, the lessened need for steel, including hot and cold-rolled and enameling sheets, has been sufficient to cause cancellation of mill tonnage. Released tonnage, however, is immediately taken by others.

Plans Output Boost—In the electric range field, Westinghouse Electric Corp. is planning for a 1949 production of 1½ million units, or about 20 per cent more than the 1948 record output. Although Westinghouse admits that inventory pipe lines generally have been filled, it asserts that retail outlets are not nearly as heavily stocked as trade reports indicate.

The quick cessation of demand on producers for stoves is attributed partly to alarm among retailers over an accumulating inventory.

Grace Sees Steel Demand Off

TREND in steel demand is definitely downward, according to E. G. Grace, chairman, Bethlehem Steel Corp., but production will run substantially full through the first half of the year. Beyond that the steel executive declined to predict, though he indicated he thought steel would be in good supply.

Commenting on a statement of Commerce Secretary Sawyer that there would be a steel shortage of 7 million tons of ingots this year, Mr. Grace said he did not know how the secretary arrived at that figure. He pointed out there have been some important cancellations both in capital and consumer goods lines, and these are important, not so much because of the tonnage involved, but rather because of "what the action tells you." In his opinion much of recent steel demand has been padded and that, in the overall picture, the

country has not been starved for

Demand Is Down - Pointing out that general industrial demand for structurals is off, the steelmaker said capital investments have been slowing down and current structural demand is dominated by public works projects. At the same time oil requirements are off, and exports, which were lower last year, may be even lower this year. In this latter connection he points to recovery of steel production and expansion of producing facilities in foreign countries, and is of the opinion ERP steel requirements would decline in time.

Expansion-Discussing steel industry expansion policy, Mr. Grace said the producers have been on the job and by the end of this year industry capacity will have been increased 10 million ingot tons since 1942. During the past three years capacity has exceeded production by 31 million tons, the lag in output being due principally to strikes and the quality of raw materials. By the end of this year, he said, ingot capacity will total 98 million tons.

Mr. Grace said he didn't know what the breakeven point of the steel industry is today, or even what his own company's breakeven point is. He explained conditions have been too abnormal to provide an answer. However, he thought producers will find out soon enough when operations get down around 70 per cent.

Referring to President Truman's comment that steel prices were too high, Mr. Grace said he did not know how there could be any decrease unless there was a decline in the cost of producing steel. Labor is by far the largest factor in costs and he saw no early possibility of reducing wages. At the same time he pointed out the steel producers can't raise wages without raising steel prices.

Interest in Manganese Mounts

Nation's dependence on foreign supply sources, including Russia, cause for increasing concern. Soviet contracts reported not being renewed.

EVER since recent allocation by the Office of Industry Cooperation of 2576 tons of steel monthly to the Canadian Car & Foundry Co. for construction of cars for transporting manganese ore from South African mines to tidewater for shipment to this country, interest has been mounting in the nation's supply position in this critical mineral, essential in the production of steel.

Recent reports out of Washington indicate something "is doing" on manganese. Just what is not clear, however. While unconfirmed officially, rumor has it that Russia, among the chief manganese suppliers, is not renewing contracts for shipment of the mineral to this country. It is said shipments have declined alarmingly since December.

Cargoes on Way-Whether the situation is as serious as the reports indicate is questionable. At any rate, only a week or so ago, E. G. Grace, chairman, Bethlehem Steel Corp., large manganese importer, told newsmen his company has had no word from the Russians of any contemplated suspension of shipments, and that, in fact, Bethlehem now has three cargoes of Russian ore on the high seas, involving about 24,000 tons.

Mr. Grace said his company has been buying Russian manganese since 1922. However, he thought that if there was a stoppage of Russian shipments, this country could get along with supplies from other sources. Throughout the war, he pointed out, there was a suspension of Russian manganese shipments. He thought

this country could get along again if necessary, and pointed to successful efforts now being made to develop the rich resources of India Africa and Brazil. He estimated the steel industry's requirements of manganese at present high operations at around 1,500,000 tons annually.

Senate Study Seen-There is little question but the manganese situation will get a good going-over by the Senate Committee on Interior & Insular Affairs in its hearings on the proposal to set up a national policy for the development, utilization and conservation of mineral resources.

In the case of manganese, most recent statistics (see accompanying table) show that Russia is a leading supplier.

But that is not all. The national stockpile of manganese ore, according to an estimate before the House Public Lands Committee early last summer, is in the neighborhood of 2,210,-000 tons, enough for less than two years' needs at the nation's present rate of consumption. In addition, consumers have their own stockpiles, usually about six months' requirements.

Domestic Reserves-In all likelihood the hearings by the O'Mahoney committee will bring renewed recommendations for an appropriation for domestic manganese development.

Present domestic production of 130,000 tons of manganese concentrate a year is but a drop in the bucket to what can be produced domestically, J. Carson Adkerson, president of American Manganese Producers Association, thinks.

FOREIGN SOURCES FOR AMERICAN IMPORTS OF MANGANESE ORE

			(Short	Tons)†						
Country	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948*
Angola					10.440				448	2,608
Belgian Congo			28,361	2,224	11,109	9,053			2,854	
	47 090	100 420	433,830	277,410	317,386	170,025	282,086	160,171	184,050	111,085
	47.838	188,430		103		2.0,020		17	257	68
Canada		0.701	19,191	100	10.649	4.289	91.334	149.564	43,450	5.500
Chile	54	8,791		156,256	211,780	467,059	293,572	158,734	57,089	24,967
Cuba	118,638	146,323	272,614		6.497	1,348		1	01,000	300
French Morocco			* * * * * *					2.868		
French W. Africa				100.054	04.507	170,655	273,479	351,633	192,277	29,339
Gold Coast	272,074	276,621	75,823	126,354	94,507			371.753	421.121	148,562
India	110,290	212,210	360,910	496,497	572,255	222,962	199,122			
Mexico			4,272	39,788	64,901	82,960	46,377	30,701	56,642	44,515
Netherlands Ind'es		5,874	10,363	8,059						
New Zealand						532			* 11 11 1	
Philippines	7.802	48,737	63,894						2,376	6,272
Portuguese Asia										1,109
Turkey										33
Union of S. Africa	3,809	199,068	292,739	214,186	92,522	28,656	124,630	2 81,8 6 1	248,703	175,068
U.S.S.R.	151,472	349.158					151,345	241,920	331,006	287,944
	395	717	136						1,585	
Others				1,320,878	1.392.048	1.157.561	1.461.945	1.749.223	1.541.818	837,370
Total	702,384	1,435,928	1,562,133	1,320,818	1,002,020	2,201,001	1,101,010	21120,220	A,012,0730	001,010

^{† 35} per cent Mn or higher,

^{*} First 9 months only. Source: Bureau of Mines

Growth in Appliances

Electrical engineers told current use to double in decade. Leeds honored

EIGHTY million appliances for home and farm, worth \$5 billion, and utilizing 25 million motors, are sold annually in the United States. This was the picture of the electrical appliance business presented to the American Institute of Electrical Engineers in convention last week at Hotel Statler, New York, by Carl F. Scott, General Electric Co., Bridgeport, Conn.

"The rate of growth of the electrical appliance business over the past decade has been twice that of the preceding decade," said Mr. Scott. Prices of appliances, he pointed out, increased only 36 per cent from 1936 to 1947, a far lower increase than has been experienced in most items.

Mr. Scott predicted that the next decade would witness a 100 per cent increase in electrical current used in the nation's homes and a 145 per cent increase in electrical current used on farms

Leeds Honored—The 1948 Edison medal was awarded to Morris E. Leeds, chairman, Leeds & Northrup Co., Philadelphia, for "his contribution to industry through the development and production of electrical precision measuring devices and controls."

Latest developments in electrical engineering and science were reviewed at the sessions which attracted more than 3000 engineers. The meeting included 38 technical sessions, where 125 papers were presented, in addition to various conferences and symposiums.

The developments covered related to communications, power distribution, transportation, energy sources, measuring instruments, magnetics, machinery and nucleonics.

Magnetic Gage Head-Among the



MORRIS E. LEEDS

new developments holding the engineers' attention was a magnetic gage head used in connection with General Electric's metals comparator for testing metal parts. D. E. Bovey, GE consulting laboratory, claimed that through use of the instrument it is possible to determine uniformity of surface hardening and to detect thin spots in plated metal parts. By using a slightly different form of testing head, he said, it is possible to check the composition of small metal objects, such as screws, rods, turbine buckets.

A new method of cooling large electrical machines, claimed to be as revolutionary as hydrogen cooling some years ago, was described by Th. de Koning, Drexel Hill, Pa. Evaporation cooling, he said, employs principles totally different from those customarily associated with hydrogen, air and fluid cooling, and provides "a standard universal solution, feasible for the cooling of large machines of all types. Water in mist form is supplied to the natural surface."

Super-speed Plane Being Built

WORK is under way on an airplane which will be 60 to 70 per cent faster than the X-1, which it was intimated is the first airplane to exceed the speed of sound in level flight, Lawrence D. Bell, of the Bell Aircraft Corp., Niagara Falls, N. Y., told a dinner meeting of the Cleveland Technical Societies Council, Jan. 31.

The aviation authority predicted that the helicopter would be speeded up and that it would be one of the great industries of the future. As an example of how fast the aviation industry has progressed, he pointed out that there are bombers today that are faster than the fastest jet fighter of only a year ago.

Canada To Help Steel Expansion

CANADIAN government is prepared to lend money to steel companies on a 50-50 basis to help them expand primary production, the dominion's trade minister has announced.

The government would match funds the steel-producing companies provided to extend their facilities.

Seek Increased Efficiency

INCREASED production efficiency with a resultant reduction in costs is playing an increasingly important role in machine tool sales. This factor is resulting in a number of sales to manufacturers who are resuming manufacturing operations that had been subcontracted during and immediately after the war; now they are performing these operations in their own plants in order to reduce the selling price of their products.

Some competition is reported from used machinery sales, particularly in standard machine tools, although the consensus is that it is not as strong as a year ago. The stock of war surplus equipment has been pretty well exhausted and as a number of dealers report only the "dogs" are left. Builders of specialized machinery, especially one Cleveland supplier of machine tools for oil country use, report that backlogs are still sizable.

In Pittsburgh, mill equipment builders' backlogs assure high level of operations through most of 1949. New business from domestic sources is not as promising as a year ago.

Kearney & Trecker Corp., Milwaukee, is the low bidder on ten milling machines for the Navy. The firm bid \$12,250.80 each, f.o.b. Milwaukee, for four machines and \$9550 on six.

Steel Wage Hearing Scheduled

PUBLIC hearing to consider a proposal to increase the minimum wage required under the Walsh-Healey Public Contracts Act in the iron and steel industry will be held Feb. 23 at 10 a.m. in the Interdepartmental Auditorium, Washington.

United Steelworkers of America has asked the Department of Labor to determine that the prevailing minimum wage in the steel industry is \$1.23 an hour, except in the South where the union asks a determination of \$1.08½ an hour. Present determination, established in 1939, ranges from 45 cents to 62½ cents an hour.

According to the union's petition, the great majority of employers outside the South are paying a minimum of \$1.23. The majority of union contracts, however specify a minimum wage of \$1.18½, except in the South where the specified minimum is \$1.04. The union would retain these rates in job classes 0-1 and 1 in the job classification scale.

Western Steel Expanding

Addition of 700,000 tons of capacity by 1950 seen but finished product output still to be short

STEEL ingot capacity in the western states is expected to expand to about 4.5 million tons by 1950, a survey by the Federal Reserve Bank of San Francisco shows. This would be an increase of more than 700,000 tons annually compared with 1948. The current total is four times that of 1940.

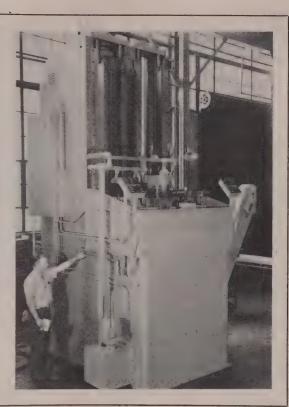
Most of the increase will take place in the San Francisco and southern Californa regions. Mills in the San Francisco region will maise capacity to 1,245,000 tons by 1950 from the 1948 level of 770,000 tons. In southern California the 1948 total of 1,332,000 tons will be boosted to 1,472,000 in the next year. Geneva, Utah, capacity will remain unchanged, but the Seattle-Portland-Tacoma area will have an increase from 412,000 to 501,000 tons.

Gap to Continue - Theoretically, the additional steelmaking capacity should bring production about in line with consumption. However, the Federal Reserve analysts point out that experience in western steelmaking has shown that "a given tonnage of ingots yields only 75 per cent of its weight in finished steel." Applying this yardstick to estimated 1949 ingot production of about 3.9 million tons means production of about 3.4 million tons of finished items. As current consumption of finished steel products in the West is about 4.5 million tons, this means a gap of 1.1 million tons between supply and demand. The difference must be made up by shipments from eastern mills.

At the same time, when ingot output reaches 4.5 million tons in 1950, the yield of finished products will fall about 25 per cent short providing demand remains at current levels. However, if there is a contraction in general business, demand may fall to about productive levels.

Before the war various estimates placed steel consumption in the 11 western states at about 2.2 million tons annually, states the Reserve Board's report. Based on ingot capacity alone (at that time), this would mean that half the district's steel was imported from other parts of the country. Actually the ratio of imports was much higher, about 70 per cent, because of the fact a given quantity of raw steel results in some scrap production while being converted to finished products, and the inability of western plants to provide

SPEEDS OUTPUT: Broaching of large diesel bearing supports can be done 20 times faster than by previous machining methods by use of this big duplex surface broaching chine, built by American Broach & Machine Co., Ann Arbor, Mich. Tooling design is featured by an automatic cycle of the left hand table and right hand broach arbor, both of which index six times in generating one complete broaching cycle



certain products. For example, sheet piling, skelp, pipe, steel rails, seamless tubes, stainless steel, wide flange beams, cold-rolled sheets, cold-finished bars, sheared plates and a number of other items were not available from western plants before the war.

Still Short of Needs — Much of the capacity added during the war did not increase significantly the range of products supplied. The major item added was substantial sheared plate capacity. The postwar expansion has witnessed improvement in western sheet, tin plate and buttweld pipe capacity, but local production of many specialty items is not yet underway.

Therefore even though consumption is now estimated at 4.5 million tons, the 4.5 million ton ingot capacity in prospect for 1950 will not meet the needs of steel users at the present rate of consumption,

Stainless steel, seamless pipe and tubing, wide flange beams, steel rails as well as some sizes and types of other products are still not available from western production.

Furthermore, the finished product yield from present ingot capacity may be less than 3.5 million tons. At the same time, the demand for plates will draw some of the district's plate production to other parts of the country.

The Reserve Bank's report fore-

sees improvement in supplies of pig iron and steel scnap. It points out the additional blast furnace to be completed at the Fontana mill late in 1949 will add some 400,000 tons of pig iron capacity. Additional relief in the scrap situation is expected from a more rapid rate of scrapping obsolete automobiles.

Premium Prices Disappearing

PREMIUM prices for steel, lead and copper have about disappeared, and many metalworking products like cars and trucks, brass, electrical equipment, pig iron, wire and valves and fittings are now much easier to get than a few months ago, according to a survey by the National Association of Purchasing Agents.

Manufacturing business did not bound back from the decline of November and December, NAPA reports. Purchasing agents indicated a slight further reduction in production and a continuing decline in backorder schedules. The declining trend of prices is more pronounced. January employment was somewhat lower than in December. Greater reductions in inventory are reported and the turnover ratios are increasing, despite the lower production and employment.

Except for the increase in freight rates, the price trend was down for January.

Private shipyards object to government entry into ship repair field as seen in proposal that Maritime Commission do certain work on reserve fleet. Congress to get controversy

ONE OF the live controversies that will have to be settled by Congress at the present session is: Will the Maritime Commission be authorized to install drydocks at its "mothball" fleet sites to do work that the shipyards contend they should do?

The commission wants to use surplus Navy floating drydocks to scrape and paint bottoms of the 2342 ships in the merchant reserve fleet and to determine the extent of needed re-

It says the cost of this work under the commission plan would come to \$54.195,987 whereas it would cost \$102,124,941 if done at private yards. By cleaning and painting bottoms at the reserve fleet sites, according to Commission Chairman W. W. Smith, the high cost of towing the ships from these sites to the private yards would be saved.

The contemplated work, he says, would be restricted to cleaning and painting bottoms and determining the extent of needed repairs; the actual repair work would be let to private yards, as usual, on the basis of competitive bidding.

Shipyards Object-Objection of the shipyards, as set forth in a letter to Admiral Smith by the Shipbuilders Council of America, is to the proposed entry of the government into a field that should be reserved to the repair yards and thus maintain them in a state of full efficiency as a vital defense industry.

Incidentally, the commission estimates that 1000 ships in its reserve fleets need repairs averaging \$180,-000 per vessel; but this is merely an estimate and the full repair program could not be set up until the ships have been examined in drydock. But all the repair work, the commission proposes, would be done by the private yards.

Four committees, the House Merchant Marine & Fisheries Committee, the Senate Interstate & Foreign Commerce Committee, and the two appropriations committees will get into this matter. Influential with these committees will be a report recently completed by Walter L. Reynolds, chief clerk and staff director of the Senate Expenditures Committee. Mr. Reynolds visited the James River, Mobile, Beaumont, Baltimore, Hudson River, Suisan Bay, Astoria, Olympia and Wilmington, N. C., reserve fleets and his report supports a program in which the Maritime Commission would install drydocks to clean and inspect ship bottoms and in which the actual repair work would be done by private

European Projects Under Study

SOME 10 to 15 important industrial plant projects for western Europe now are being studied by the Paris office of the Economic Cooperation Administration and the first of these may come up for authorization shortly. It calls for two aluminum foil

ATOMIC RESEARCH

ALTHOUGH \$3 billion has been allocated to atomic energy projects so far, important research and development problems remain to be solved, the Atomic Energy Commission states in its fifth semi-annual report to Congress.

The commission asserts further co-operation with industry is necessary but it isn't certain just how this co-operation can be achieved. However, business men will get more of the information they need and work will be pushed on developing atomic power for vessels, airplanes and electric power plants.

There is no indication yet when this atomic power will be practical for commercial use, the commission's report states.

plants to be established in France, one by Etablissements Charles Coquillard and the other by Trefilaries du Havre.

Equipment to be ordered from United States manufacturers will come to about \$1 million for each plant. Additional equipment coming to 200 million francs for each plant will be bought in France. These plants, incidentally, originally were planned prior to the Marshall Plan era, and contracts for American equipment were placed with Hydropress Inc., New York; these recently were can-

Steel Expansion-Projects under preliminary study by ECA at Paris include steel expansion plans for Italy, France, Austria and the United Kingdom. Norway, incidentally, has not applied for Marshall Plan assistance to finance its plan for construction of a large new steel plant.

Saudi Arabia Pipeline Limps

THE SHARPLY controversial projected oil pipeline in Saudi Arabia still is limping along with no indications as to when its owner, the Arabian-American Oil Co., will be able to com-

Of the 240,000 to 250,000 tons of steel the line requires, only 62,000 tons have been obtained; there has been no tonnage allocation by the Office of International Trade since the second quarter of 1948. By the original schedule the last of the steel was intended to be shipped in this first quarter of 1949.

American "Know-How" Sought

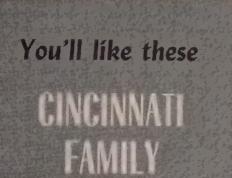
ANOTHER delegation of foreign industrialists bent on learning United States industrial "know-how" secrets arrived in New York recently from Denmark. Sponsored by the Economic Cooperation Administration, the party consists of five teams each containing five members, three from labor and two from management. Among them are two teams of interest to readers of STEEL. One team will visit selected iron and steel plants, while another will visit machinery manufacturing pants.

Book Aluminum Mill Equipment

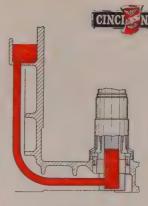
CINCINNATI Milling Machine Co. and Lewis Foundry & Machine Division of Blaw-Knox Co. have been awarded contracts for equipment for an aluminum sheet rolling mill to be built with Marshall Plan assistance in Austria. The former will furnish two roll grinders coming to in excess of \$180,000, while the latter will furnish a cold reduction mill and a cold rolling mill coming to in excess of \$200,000.

To Review Reserve Plants

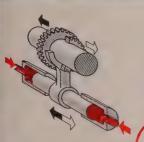
COMMITTEE composed of leaders in eight industrial fields has been organized to recommend which plants



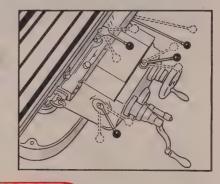
CHARACTERISTICS



Left: Cincinnati vertical screws never get stubborn and balky; they never squeal from the heat of heavy work. That's because they're automatically lubricated from an individual reservoir which you can fill with EP oil.



Soothing syrup to fretful cutting, Dynapoise overarms dampen out chatter; pay off in higher feed rates for many setups.



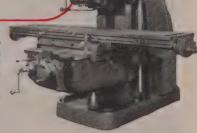
Above: It's no effort at all to select spindle speeds as often as the job requires. ... hydraulic power shifts the gears. Excepting in the junior models, feed gears are also shifted by power.

When you consider the purchase of kneeand-column type milling machines, look for features that pay off year after year. Cincinnatis have many of them. The four illustrated here are common to all cincinnati ML, MI, Dial Type, High Power and Dual Power Dial Types. That's one big reason why it pays you to equip your shop with Cincinnatis. Write for catalogs and then compare feature for feature. For the long pull, you'll save with Cincinnati. New men don't need a memory training course to operate a Cincinnati. As the lever is moved, so goes the feed motion; technically, it's directional control.



3 and 5 hp sizes. No. 2ML plain and universal. No. 2Ml plain, universal, vertical. Catalog M-1662.

Left: Intermediate power Dial Types. Nos. 2, 3 and 4 sizes; medium speed and high speed; plain, universal, vertical. Catalog M-1623-1. Right: The powerful group—up to 50 hp for the big boy. High Power and Dual Power Dial Types; Nos. 3 and 4 sizes, plain, universal and vertical; Nos. 5 and 6 sizes, plain and vertical. Catalogs M-1644 and M-1647.



THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U.S.A.

MILLING MACHINES

BROACHING MACHINES

CUTTER SHARPENING MACHINES

FLAME HARDENING MACHINES

OPTICAL PROJECTION PROFILE GRINDERS

CUTTING FLUID

and equipment now held by the government in the National Industrial Reserve should be retained or disposed of for commercial use.

In addition to reviewing the justifications for retention of property in the National Industrial Reserve, the committee has the statutory duty of reviewing maintenance standards for this property and recommending changes.

The Munitions Board has designated 241 plants for disposal under the National Industrial Reserve provisions. At the present stage of the program 5693 machine tools have been designated for the National Reserve. As shipping orders are complied with, these tools are placed in Federal Works Agency warehouses.

Co-ordinate Defense Programs

E. P. BROOKS, vice president in charge of factories, Sears, Roebuck & Co., has been named chairman of the Committee on Equipment and Materials of the Research & Development Board, National Military Establishment.

The work of the committee will be to co-ordinate and evaluate research and development programs of the Army, Navy, and Air Force concerned with equipment and materials. This will include instruments, such as cameras and meters; food as it lends itself to packaging; clothing and personal equipment; service equipment, such as hand tools; water supply; shelter and storage; electrical equipment, such as motors and cables; vehicles, including all types except armored; heavy equipment, such as bridging and earth moving machines and cranes; and materials and processes, such as textiles, woods, rubber, ferrous and nonferrous materials, plastics, surface coatings and camouflage equipment and materials.

Grether Resigns NSRB Post

JOHN R. STEELMAN, acting chairman, National Security Resources Board, has announced resignation of Dr. Ewald T. Grether as director of the board's Office of Economic Management to return to his duties as dean of the University of California School of Business Administration. The resignation is effective Feb. 1.

Dr. Grether will continue his association with the board as a consultant and as a member of advisory committees. He has been serving on loan from the university since last

Air Force Switches Contracts

CONTRACT switches involving three

BETATRON: Readied for shipment to the University of Illinois is this 22-million-volt betatron to be used for cancer treatment and research. The unit, seventh to be built by Allis-Chalmers Mfg. Co., Milwaukee, weighs $5\frac{1}{2}$ tons

companies and \$300 million in airplane orders have been made by the U. S. Air Force.

Orders for Northrop "Flying Wing" medium bombers and North American B-45 four-jet medium bombers were cancelled in favor of Consolidated-Vultee's 150-ton longrange B-36 bomber. The B-36 probably will be built at Convair's Ft. Worth, Tex., plant.

The Air Force also announced that the last \$109,000,000 remaining in its funds available for new aircraft would be spent for 48 Northrop F-89 twin-engine night fighters and 110 Lockheed F-94 night fighters.

Heavy Scrap Drive Pressed

BUSINESS paper editors and officials of trade associations and chambers of commerce were urged by Secretary of Commerce Charles Sawyer last week to participate whole-heartedly in the national drive for iron and steel heavy scrap. He asked they inform business executives of the need for heavy scrap to sustain production and accumulate reserves.

Secretary Sawyer said: "We are not planning an all-out wartime type of scrap campaign. We are seeking to stimulate operating executives to canvass their plants so that obsolete machinery, tools, and fixtures will be collected for use as scrap."

To further the heavy scrap drive a series of advertisements prepared by The Advertising Council will be placed in various business papers and trade journals during the coming six months.

Public Not Greatly Interested

IT SEEMS strange that the Congressional Record, one of the most significant and revealing publications of the times, has almost no public appeal. The Record, which not only records each day's debate but lists all the bills that go into the House and Senate hoppers, has been improved during the past year by addition of a digest section which sums up important acts of Congress and summarizes the activities of all committees of both houses.

Fred Cromwell, superintendent of documents, Government Printing Office, reports paid subscriptions to the Congressional Record fluctuate between 2000 and 2500. The rest of the 40,000 to 42,000 copies printed each day go to members of Congress, government officials, news correspondents and others on the complimentary list. Senators may frank up to 100 copies daily and representatives up to 70.

European Power Output Up

About 50 per cent for all ECA nations except Germany, but shortages persist

ELECTRIC power production has inreased 50 per cent above prewar outout in all ERP countries except Gernany, according to Economic Coperation Administration.

Britain is now generating 10 per cent more than a year ago and 80 per cent more than before the war, but a power shortage remains. The rench coal strike last fall is still laving an effect on the nation's generating output.

In Brazil a \$75 million loan has been granted by International Bank for Reconstruction & Development to expand hydroelectric power facilities and telephone installations.

Western Germany

CONTRIBUTING to Western Gernany's power shortage are dismantings and reparation commitments. Some generating plants have been or are scheduled to be dismantled, and the Ruhr must also export some of ts power to Belgium and the Netherands.

To combat this situation, German ndustry is resorting to staggered shifts and other expedients, all of which don't help industrial productivity, a matter causing increased concern in the Ruhr. Before the war annual production of rolled steel per worker was 79.4 tons. In 1948 only 30 tons were turned out per worker Before the war ten men in steel processing plants depended upon one man in steelmaking. The ratio is now 20 to 1.

Still another cause for concern is the slow progress in reorganization of the steel industry along vertical lines. The question has served as a fuse to set off political fireworks as to what German nationals will become members of the control boards. In the meantime the plants are operating under their former setup.

Great Britain

GREATLY increased demands for electric power account for the fact that the United Kingdom still has an acute power shortage despite increased output.

Thus far this winter, however, power cuts imposed upon industry have been less severe than last winter because of the production boost and milder weather. Adequate supplies of electric power, once envisioned for 1952, will not exist until



VOLKSWAGEN: The "peoples' car," manufactured in the British zone of Germany, is being imported into the United States. The light car weighs 1260 pounds, has 25 horsepower, and gasoline mileage of 37½ miles per gallon. Photo shows Bernardus M. Pon, left, of Pon's Automobielhandel, Holland, and John Van Ryn, of the Holland American Line, watching the midget being unloaded in New York. NEA photo

some years after that date because the construction of generating capacity is proceeding more slowly than expected. In 1948 only 327,000 kw were added to Britain's capacity when the goal for the year had been about 900,000 kw. An increase of 1,450,000 kw was scheduled for 1949, but even government planners now admit this cannot be achieved.

One reason for the program's setback is the shortage of structural steel, more of which is now being used than at any time since the war ended.

France

ALTHOUGH the French coal miners' strike ended Nov. 4, production is only now resuming normal proportions. Aggravating the situation was the U.S. longshoremen's strike which cut coal imports during November to about 60 per cent of average deliveries. As a result, coal consumers, particularly the power industry, have been hard pressed.

The coal strike, according to some economists, has also contributed heavily to a chain of economic reactions which has forced the government to freeze prices at the Dec. 31 levels because of the rising cost of living. In an attempt to balance its 1949 budget, the government has also tacked on higher production and distribution taxes and has raised transportation rates. Producers and middlemen must absorb the levies on most products, including steel.

Production of cars and trucks con-

tinues to climb. Over 9500 passenger cars and 9100 trucks were produced in November. Auto output is 104.3 per cent of the 1938 average. Truck production is 225 per cent of the prewar figure. The nationalized Renault plant showed the lowest priced car at the Belgian Motor show in Brussels. The price is \$1200, \$100 lower than a year ago, for a tiny vehicle which develops 20 hp. The cheapest American entry was the 1949 Chevrolet at \$2500. The British Ford and Crosmobile and the Italian Fiat, all small units, were priced at \$1300. The German Volkswagen retails for \$1390 and the Opel, a 30 hp car, for \$1730.

Italy

IF PILOT explorations are successful, one region in Italy may circumvent the nation's coal shortage by tapping water sands near red-hot lava beds for high pressure steam to turn turbine generators.

Westinghouse Electric International Co. recently reported an initial order for two 300-hp mud-pump motors and one 250-hp draw-works motor for use on the drilling rigs. The lava beds are at Larderello, near Milan.

Brazil

BRAZILIAN Traction, Light & Power Co. Ltd. has been granted a \$75 million loan from the International Bank for telephone and hydroelectric expansion in the Rio de Janeiro and Sao Paulo areas.

The company will purchase its equipment from the United States, Canada, the United Kingdom and Western Europe.

More Ore To Be Shipped Japan

INCREASE in shipments of iron ore from this country to Japan is in prospect over the next few months.

In February exporting of 100,000 tons of ore to Japan is expected to be completed, but negotiations now under way may result in further export of 200,000 tons during 1949.

The present contract with the Supreme Council is held by Eximporting Co. of San Francisco. It has obtained the ore from Utah Construction Co. which has leased deposits of ore in the Cedar City area of Utah. Shipments have been made under this 100,000-ton contract since last July.

The new contract now being negotiated for 200,000 tons of ore is being signed with the Supreme Coun-

cil by C. T. Takahashi & Co., a Los Angeles and Seattle import-export firm. It has not disclosed the source of its ore supply, but three sources are said to be under consideration. One of these is in Utah, it is reported.

Scrap Mission Tours Japan

AMERICAN scrap iron and steel mission to Japan, having completed its survey of the Tokyo-Yokohama area, is now investigating major scrap piles in the industrial areas of southern Honshu and Kyushu.

The mission will report on amounts of scrap available for export to the U. S. The scrap technicians are Marshall A. Shapiro, president, California Metals Co., Oakland, and George L. Sturm, executive vice president, David J. Joseph Co., Cincinnati. Steel representatives are Ronald S. Coulter, special engineer, Bethlehem Pacific Coast Steel Corp., San Francisco, and William G. Walk, assistant to the general superintendent, Homestead Works, Carnegie-Illinois Steel Corp., Pittsburgh.



45-YARD DIPPER: Capacity of this dipper is being increased 5 cubic yards without any increase in loaded weight through redesign and use of modified armor plate steel. The dipper is shown in experimental operation on a Marion Shovel at a Hanna Coal Co. mine in southern Ohio. Two years ago, dipper capacity was raised from 35 to 40 cubic yards. The new 45-yard shovel loaded weighs no more than the 35-yard shovel three years ago

ECA Studies Metal Imports

European mission to gather data on foreign trade in lead and aluminum

ECONOMIC Cooperation Administration is engaged in a detailed review of all aluminum and lead shipments into the United States last year and is sending a mission to Europe to determine the irreducible needs of the countries participating in the Marshall Plan for western hemisphere metals for uses for which secondary metals cannot be substituted. (See STEEL, Jan. 24, p. 93).

Howard Bruce, deputy administrator, ECA, said timing of the greatly increased movement of aluminum and lead from Europe to this country "certainly suggests the possibility that ECA-financed shipments to Europe may have contributed to the increased western movement. On the other hand, it is possible that the explanation may lie in the tight supply of those metals in the United States which naturally stimulated the purchases from Europe."

Spirited Controversy—Mr. Bruce's earlier statement on Dec. 14 that abnormally large quantities of scrap metals were entering this country for sale at "high prices" started a spirited controversy, with Britain, Belgium and the Netherlands denying any improper sales.

Investigation so far indicates that a major portion of the imports into the United States consists of transshipments of metals through one or more countries, which were recorded in the U. S. statistics of imports as coming from sources other than those shown in the statistics of the European countries.

"Shipments of secondary metals into this country through private channels of trade, whether directly or as transshipments, regardless of their point of origin, constitute in themselves no ground for criticism of any participating country or of its nationals," Mr. Bruce said. United States imports from ECA participating countries did not assume importance until June of this year, about the time when ECA-financed shipments began. Imports from all ECA countries averaged 9237 net tons of aluminum per year in the 1935-1938 period compared with 3917 tons in 1947, 3884 tons in the first five months of 1948 and 38,190 tons in the next six months. Imports of lead during the same period were, respectively, 214 net tons, 1272 tons, 9156 tons, and 28,972 tons.

Procurement authorizations issued by ECA through November,

1948, to all participating countries totaled 185,956 tons of aluminum and 113,015 tons of lead.

The influence of these shipments makes itself felt in the following ways, Mr. Bruce said: They would have a tendency to further tighten the United States supply; availability of dollar purchasing power through ECA funds enabled the participating countries receiving ECA financing to purchase supplies of virgin aluminum and lead in the western hemisphere, thus improving the availability of all forms of aluminum and lead in their countries; and such a condition would encourage European nationals to gather up scrap materials, put them in condition for shipment, and send them to this country.

Construction Volume May Fall

DECREASE of about 5 to 10 per cent in the volume of construction from last year's all-time high, resulting in stabilization or even reduction of building costs, has been forecast for 1949 by Melvin H. Baker, Buffelo, president of National Gypsum Co.

Increased availability of labor and the tendency among contractors to use more modern methods, machines and materials were cited by Mr. Baker as factors which will cut into costs in an address delivered at the 96th annual meeting of the American Society of Civil Engineers in New York.

Building Equipment Sales May Lag

MAJORITY of the nation's construction equipment distributors expect a drop in sales volume and lower profits in 1949, according to a nation-wide survey just completed by the Associated Equipment Distributors.

Determined buyer resistance and keen competition are also expected in the construction equipment field, although the sales decline is not expected to be abrupt or severe. Many distributors feel that substantial numbers of buyers have been priced out of the market.

Generally in 1948 distributors prospered. They chalked up a better sales record than in 1947 when an estimated \$1 billion worth of equipment was sold. While total expenditures on new construction exceeded \$17 billion in 1948—up 26 per cent from the previous year—distributors' sales showed a much smaller increase.

Electrical Industry Has Best Year

ELECTRICAL manufacturing industry reached a new all-time high level of production during 1948, exceeding previous record year of 1947 by about

5 per cent in actual physical ouput. Dollar volume increased slightly more than \$1 billion, an improvement of 14 per cent.

Output of Oil Field Goods Rises

STEEL industry has made effective progress in increasing production of oil country goods and line pipe, Earl W. Clark, director of the office of Industry Cooperation, has reported on releasing the findings of a special study on the field.

Output of oil country goods—consisting chiefly of tubular goods used in well drilling—reached 1,674,876 tons in 1948, sufficient for drilling 39,121 wells. Estimated production for 1949 is 1,803,103 tons. Estimated needs of 1,840,400 tons for 1949 are based on the anticipated drilling of 43,000 wells this year, about 4000 more than were drilled in 1948.

During 1948 output of line pipe was 2,221,084 tons, an increase of more than 200 per cent over the 1936-39 yearly average. Estimated 1949 production is 2,553,517 tons.

Aluminum Group Elects Officers

ALUMINUM Association has elected R. S. Reynolds Jr., Reynolds Metals Co., Richmond, Va., president for the ensuing year.

The following were elected vice presidents: E. C. Grundstrom, Advance Aluminum Castings Corp., Chicago; M. E. Rosenthal, United Smelting & Aluminum Co. Inc., New Haven, Conn.; and George N. Wright,

John Harsch Bronze & Foundry Co., Cleveland. A. V. Davis, Aluminum Co. of America, New York, was reelected chairman of the board, and Donald M. White was feappointed secretary and treasurer. Three directors-at-large were elected to serve for three-year terms: Frank B. Cuff, Alcoa; R. G. Farrell, Fairmont Aluminum Co., Fairmont, W. Va., retiring president of the association; and W. A. Singer, Apex Smelting Co., Chicago.

Metal Show Plans Progress

FLOOR plans for the metal congress and exposition to be held in Cleveland's Public Auditorium Oct. 17-21 have been mailed to exhibitors and space assignments will be made March 12, according to W. H. Eisenman, secretary of the sponsoring American Society for Metals and managing director of the show.

Engineers' Day at Colorado

ALL BRANCHES of engineering will be represented at the fifteenth annual Engineers' day of the Colorado School of Mines in Golden, Colo., Apr. 22-23.

The event will feature technical sessions in mining, metallurgy, petroleum production, petroleum refining, geophysics and geology. Also included in the program will be exhibits from companies engaged in the mineral industries and a tour through the Bureau of Mines Experimental Station in Golden.

Calendar of Meetings

Feb. 7-8, National Association of Purchasing Agents: Mid-winter conference on public utility buying, Edgewater Beach Hotel, Chicago. Association headquarters are at 11 Park Place, New York.

Feb. 7-9, American Road Builders' Association: 46th annual meeting at Hotels Mayflower, Statler and Willard, Washington. Association headquarters are in the International Bidg., Washington.

Feb. 7-11. Automotive Accessories Manufacturers of America: Convention in Philadelphia. Association headquarters are at 501 Hardt Bldg., Philadelphia.

Feb. 10-11, Tweifth Annual Regional Foundry Conference: Sponsored by Wisconsin chapter of American Foundrymen's Association and University of Wisconsin, at Hotel Schroeder, Milwaukee.

Feb. 13-17, American Institute of Mining & Metallurgical Engineers: General meeting, San Francisco.

Feb. 14-15, Edison Electric Institute: Convention at St. Louis. Institute headquarters are at 420 Lexington Ave., New York.

Feb. 21-22, Purdue University and Material Handling Institute: Materials handling conference on Purdue campus at Lafayette, Ind

Feb. 28-Mar. 4, American Society for Testing Materials: Spring meeting and committee week, Edgewater Beach Hotel, Chicago. Society headquarters are at 1916 Race St., Philadelphia. Mar. 3-5, American Society of Training Directors: Fifth annual conference, Hotel Carter, Cleveland. Society headquarters are at 705 Fidelity Bidg., Cleveland.

Mar. 10-12, American Society of Tool Engineers: Seventeenth annual meeting, Hotel William Penn, Pittsburgh. Society head-quarters are at 1666 Penobscot Bldg., Detroit.

Mar. 11-12, Ohio Regional Foundry Conference: Second conference, to be held on Ohio State University campus.

Mar. 14-17, Chicago Technical Societies Council: Seventh Chicago production show. Show manager is Edward C. Bowman, 8 S. Michigan Ave., Chicago.

Mar. 22-23, Export Managers Club of New York Inc.: Meeting, Hotel Statler, New York, Club headquarters are at 2 Lafayette St., New York,

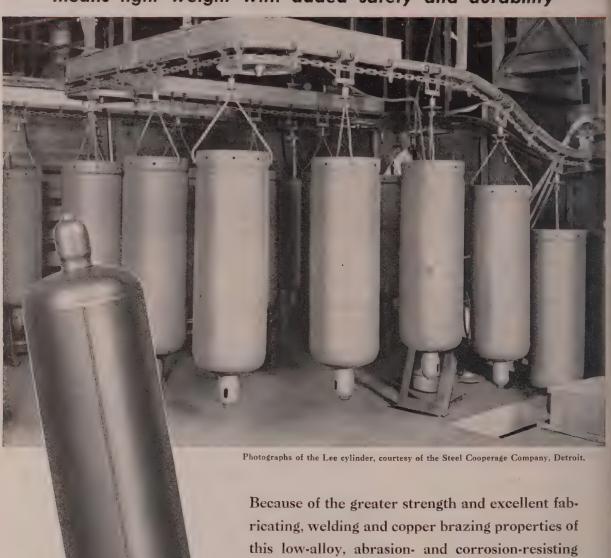
Mar. 30-31, Apr. 1, American Iron & Steel Institute: Meeting of chairmen and presidents of company members, The Greenbrier, White Sulphur Springs, W. Va.

Apr. 5-6, Metal Powder Association: Fifth annual meeting and exhibit, Drake Hotel. Chicago. Association headquarters are at 420 Lexington Ave., New York.

Apr. 6, Detroit Chapter of American Foundrymen's Society: Congress of foundry experience, Rackham Memorial Bldg., Detroit. Jess Toth, Harry W. Dietert Co., is committee chairman for event.

N-A-X HIGH-TENSILE STEEL in L.P.G. Cylinders

means light weight with added safety and durability



Because of the greater strength and excellent fabricating, welding and copper brazing properties of this low-alloy, abrasion- and corrosion-resisting steel, cylinders made with it (to conform to I.C.C. safety requirements) are 35% lighter in weight than when made with conventional carbon steel.

This weight reduction (with longer life) means greatly reduced shipping and handling costs . . . and over-all savings to consumers.

GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN UNIT OF NATIONAL STEEL CORPORATION

GREAT LAKES STEEL CORPORATION

HIGH-TENSILE STEEL

Mirrors of Motordom

Chrysler swinging over to new models production on all lines. Assembly lines expected to be rolling off 24,000 units weekly by Mar. 1. Dealers see new models

DETROIT

FINAL cleanup of 1948 model production was completed last week at Chrysler Division plants here and extra pressure was applied to the full conversion of manufacturing and assembly facilities to new series passenger cars. There were a few hundred of the 1949s sandwiched into the final run of 1948s at all divisions, but the big swing to the latest designs is now in progress, requiring several weeks' time during which a few thousand employees will necessarily be idle. Overtime and weekend operations have been in effect a number of weeks for millwright crews and plant maintenance personnel in the effort to speed the changeover. By March 1 assembly lines should be well on their way toward resumption of the 24,000-weekly output which Chrysler. Plymouth, Dodge and DeSoto have been supplying.

· First public showing will be Dodge, on Feb. 25, followed at approximately weekly intervals by the other divisions. Meanwhile, dealer groups are convening this month throughout the country at key locations to inspect new models and to learn the engineering and sales story behind them.

Conservatism Rules-A recent leisurely inspection of an assortment of the 1949 Chrysler products emphasizes what was reported here Jan. 24 -that designers have stuck to the conservative, with particular emphasis on headroom and ease of entrance and exit. Doors swing wide to practically 90 degrees and the 6-foot driver can climb under the wheel or into rear seats comfortably and without crouching. This has meant naturally that the cars have a rather high and squarish appearance from the side, in contrast with many other makes now on the market. There is also a marked similarity in contour between the four lines, suggesting Chrysler has worked out the idea of interchangeability of bodies and body components to a degree never yet achieved. It is an important costsaving technique which General Motors has demonstrated capably for a number of years.

Front fenders do not sweep back the full length of the body as on

Ford, 'Kaiser-Frazer, Hudson and others, rather they blend smoothly into the door panel at a point about one-third the width of the door. A large increase in windshield area contributes to improved vision from the front, with windshield glass continuing of the flat type. Dash panels are curved inward transversely, giving

Automobile Production

Passenger Cars and Trucks— U. S. and Canada

	1948	1947
January	422,236	366,207
February	399,471	393,636
March	519,154	443,588
April	462,323	445,138
May	359,996	404,190
June	454,401	421,466
July	. 489,736	400,944
August	478,146	364,958
September .	437,181	444,500
October	516,843	461,536
November	495,918	417,492
December	500,000*	492,819
12 mos. 5	,535,405*	5,056,474
e Preliminary.		

Estimate for week ended:

ALESS 6 4.6	AREACC ACA	A SECOND CARGOOM		
			(same	
			week)	
		1949	1948	
Jan.	15	112,587	109,031	
Jan.	22	113,820	110,774	
Jan.	29	115,512	101,044	
Feb.	5	105,000	82,717	
	Ward's Au	tomotive Re	ports	

more knee room for front-seat passengers.

Await Public's Reaction — Public reception will be an interesting thing to watch in these models since they reverse a trend which has been fairly industry-wide. Chrysler has bet a tidy \$90 million its ideas are right. On the other hand, as has often been pointed out, car buyers are fickle people, often saying they would buy things which they would turn away from if they could actually get a look at them.

No breakdown of the \$90 million new model expenditure has been furnished by Chrysler as yet. However, it would not appear likely this entire amount has been spent on just the tools and dies for new bodies. Substantial appropriations have been allocated for plant equipment, including new conveyor lines, paint spray booths and ovens, machine tools and the like, now being brought into full operation.

Nylon Fabric Used-Chrysler is using a new type of all-nylon fabric for interior trim on some of its models, first on the Chrysler Windsor and New Yorker sedans. Experiments on nylon cloths were started five years ago, engineers devising all sorts of special tests to prove their strength and permanence. Pieces were placed 10 inches from carbon arc lights in temperatures of 130° F for 50 hours to determine their fading qualities. They were twisted, pulled, stretched and rubbed endlessly. Finally, to make sure colors would not rub off, the cloths were placed in distilled water at 100° F and then placed in ovens at 175 degrees for two hours under 30 per cent humidity, meanwhile being rubbed under pressure while both wet and dry.

Pushbutton Door Locks

AN INTERESTING although insignificant engineering development appears on the new General Motors "A" Body, used by Chevrolet, Pontiac and the smaller Oldsmobile 76 series. 'It is the pushbutton door lock, made necessary because the outside body bulge would not allow door handles of the conventional turning types. Two years have been spent engineering these locks, and at one time three engineering staffs were at work on the problems involved. It was necessary to devise a button which would lock the door from the outside when it was being held in the pushed-in position.

The toughest job, however, was to perfect a latch which would trip easily, yet still be safe and impossible to jar open. The lever action of the typical door handle exerts 200 inchpounds of work, but the %-inch travel of the pushbutton exerted less than 6 inch-pounds. A further complicating factor was the high seal pressure -80 pounds minimum-which must be maintained against the weatherstripping. In a standard lock this 80-pound force exerted friction against the latch, so it was necessary to devise a method of tripping that would be independent of seal pres-

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-MIRKORS OF MOTORDOM-

sure—finally accomplished by working out a means of locking by "hooking" instead of by pushing.

New Seat Spring Construction-Another feature of these bodies is a new type of spring construction for front seats. It is 14 per cent lighter than the former coil springs, requires less floor space for manufacture and can be produced in Fisher Body's own plants, with the introduction of some unusual processing and assembly techniques. Further, it is noted that an assembly plant can be shipped a week's supply of seat springs in half a carload instead of the two to three carloads formerly required. Finally, with the new spring arrangement, the underneath part of the cushion is hollow, making it possible to provide space under the front seat for the feet of rear-seat passengers.

These developments and others were reviewed by W. J. Davidson, General Motors executive engineer, at a press meeting held before recent New York show which, incidentally, was considered highly successful by corporation executives who watched an estimated 300,000 pour into and out of the Waldorf-Astoria during the eight days of the display. On the subject of price, Mr. Davidson drew some comparisons between the per-pound cost of automobiles versus other commodities. Average currently is about 50 cents a pound, the Chevrolet 40 cents or only 5 cents over the pound price 24 years ago. By contrast, vacuum cleaners cost \$4.50 per pound, typewriters over \$5, electric toasters \$4, and road rollers, in case you are interested, 76 cents. The current Chevrolet 4-door sedan, weighing 3150 pounds, contains 2673 pounds of iron and steel, 95 pounds of other metals and 382 pounds of other materials.

Eddie Hunt "Retires"

E. J. "EDDIE" HUNT, long one of the automotive industry's top production specialists and since 1945 directing production planning for Kaiser-Frazer Corp., has cleared up mysteries as to his whereabouts by announcing his retirement at the age of 56 despite "being a little dubious that I am the type to enjoy a life of leisure." He, probably more than any other individual, was responsible for the rapid tooling and equipping of the K-F Willow Run plant. For a time he was manager of operations and then tackled another tough production job at the company's Detroit engine plant. His skilled planning and direction there boosted output 300 per cent in five months.

Mr. Hunt figured prominently in tooling of the first Chrysler automo-



E. J. HUNT

biles back in 1924 and continued in this work for 16 years, finally becoming staff master mechanic. In 1940 he was transferred to head operations at the Chrysler tank arsenal and whipped things together there so rapidly and efficiently he became the recipient of the first Army-Navy "E" Award. His surprise switch to Kaiser-Frazer in January, 1945, reportedly at a salary three or four times what he was making at Chrysler, astounded the machinery trade but his close connections with suppliers stood him in good stead in the new post. He is a rough, tough individual who knows the automotive production game inside and out, having started as a foreman in the crankshaft department of Maxwell in 1913. It is difficult to believe he actually plans to retire, and his reappearance in a top production post with some other manufacturer would not surprise his host of friends.

Ford Forms International Unit

ORGANIZATION of the Ford International Co. to co-ordinate and assist all international affiliates of Ford Motor Co. is the first step in overhauling overseas operations of the Dearborn manufacturer. It will have no stock interest in any of the 36 foreign subsidiaries, branches or associated companies, serving primarily as a consulting service on improvement of products, expanding distribution and problems relating to financial, supply, exchange, engineering, manufacturing, sales and human relations factors.

President of the new company is

Graeme K. Howard, who joined Ford about a year ago and recently returned from extensive investigation of overseas operations in company with E. R. Breech, executive vice president, who will be on the board of directors of the international company, along with Henry Ford II, W. T. Gossett, J. R. Davis, L. D. Crusoe, H. T. Youngren, D. S. Harder and Benson Ford. Sir Stanford Cooper. vice chairman of the British Ford company, and Douglas Greig, president of Ford of Canada, have been invited to serve on the board as well. Headquarters will be at 445 Park Ave., New York, with engineering and manufacturing staffs stationed at Dearborn, integrated with the corresponding divisions of the home company. An overseas distributors' branch will be located in the Harborside Terminal Bldg., Jersey City, N. J.

Furor Over Regulation "W"

FUROR over impact of the Federal Reserve Board's regulation on automobile sales is continuing after being touched off by Henry J. Kaiser who, in a speech at San Francisco before the National Automobile Dealers Association, further belabored the Reserve Board to extend time payments on autos to 24 or 30 months, instead of the present 18. many auto dealers, handling both new and used cars, have echoed his sentiments, they do not appear particularly vociferous. Some used car dealers argue plausibly that if credit terms were extended to two years, purchasers might find their cars worth less at the end of one year than they owed on their loans. This would not sit well with finance companies, since repossession would then be at a loss. Commenting on the question, C. E. Wilson, General Motors president, said recently, "We are really talking about what is a sound credit policy for the country personally, I am not too much in a hurry to get too many folks in debt."

Packard Jet Contract Dropped

PACKARD Motor Car Co.'s contract for development of aircraft jet engines has been terminated by the U.S. Air Force which expressed satisfaction with Packard's work but declared that higher priority had been given to other engine programs.

The government-owned plant and laboratories at Toledo, O., where Packard had been carrying on the program and which the company has been operating since 1945 under an agreement with the Air Materiel Command, will be closed and "mothballed."



WARCO DOUBLE CRANK GAP PRESS

FOR HIGH PRODUCTION PRESS WORK

The popular Warco Double Crank Gap Press represents the last word in presses of this type. It is a sturdy production press operating at 30 strokes per minute. Job tested -- the Warco has proved time and again that maintenance costs can be cut -- that operator efficiency and production can be boosted, safely and economically.

Warco can furnish this type press in single or double back geared, single end or twin drive to main shaft, according to customer's requirements. They are available in 35 to 500 ton capacities - or larger.

Press pictured here is used with cam operated forming die to double flange three sides of 24 x 96 inch steel panel.

RESISTANCE WELDERS FOR EVERY APPLICATION ● PRESSES FROM 50-TON OBI TO 2000-TON DOUBLE ACTION



THE FEDERAL MACHINE AND WELDER COMPANY Dept. 429, Warren, Ohio Offices in Principal Cities



CF&I Expands Wire Mill

To handle greater supply of rod anticipated from its new rod mill at Pueblo, Colo.

COLORADO Fuel & Iron Corp. is expanding its wire mill in Pueblo, Colo., to handle the greater supply of rod anticipated from its new rod mill in Pueblo, expected to begin operations early in September. Structural work on the rod mill has been virtually completed, and installation of equipment has begun.

Among the major expansions at the wire mill is the setting up of 14 new Vaughn wire drawing machines. A fourth galvanizing pan will also be installed to take care of fine wire production from the Vaughn equipment which will be used for netting purposes. A Wean poultry netting machine capable of producing two-in. locktwist netting at 135 feet per minute has already been delivered, and two more are due by spring. Rex wire fabric equipment is also scheduled to arrive in a few months.

New handling equipment will be installed in the wire drawing room, the nail room and the galvanizing room.

Refuses to Review WAA Sale

SUPREME Court last week refused to review the decision of a lower court approving the sale of government-owned blast furnace facilities at Granite City, Ill., to Missouri-Illinois Furnaces Inc., Koppers Co. Inc. subsidiary. WAA's sale of the property in October, 1947, was contested by Fulton Iron Works Co., St. Louis, which along with Tucker Corp. was a disappointed bidder at the time the government offered the plant for sale.

Bendix Aviation Expands

BENDIX Aviation Corp., Detroit, spent \$4.1 million during the 1948 fiscal year, ending Sept. 30, for additions to manufacturing facilities, according to the company's recently released annual report.

The firm has spent a total of about \$19 million since the war on expansions which have boosted its factory floor area from 2,803,843 sq ft as of Sept. 30, 1945, to 3,725,400 sq ft last Sept. 30.

Automotive products now account for 38 per cent of the Bendix business volume; aviation production and engineering for 42 per cent; and miscellaneous production of radios, appliance parts and industrial equipment for 20 per cent. In 1936-39, the pro-



AVOIDS TUNNELS: A high-and-wide railroad route was required to ship this 25-ton blast furnace hopper from Glassport, Pa., to Indiana Harbor, Ind. The hopper measured 18½ feet above the rails after it was loaded on a depressed-center flat car, and more than 10 feet wide. Special routing was necessary to avoid tunnels and low or narrow bridges. Casting was produced by Pittsburgh Steel Foundry Co. for Inland Steel Co.

portions were 61 per cent, 33 per cent and 6 per cent, respectively.

The corporation had a backlog of unfilled orders, including engineering projects for others, of \$162 million on Sept. 30, compared with \$101 million a year earlier. Sales and other operating income for 1948 amounted to \$162,495,665, compared with \$141,625,820 for fiscal 1947. Net income last year was \$11,280,742, compared with \$5,248,999 for 1947.

Foote Backlogs Skip To New High

FOOTE Bros. Gear & Machine Corp., Chicago, completed its fiscal year ending Oct. 31, 1948, with a record order backlog of \$8,700,000. New business, however, for the firm's Industrial Gear Division declined during November and December.

Production of Foote's Industrial Gear Division continued throughout the year at a high level. The Precision Gear Division output increased steadily during the year and exceeded that obtained in the 1947 fiscal year. As of Oct. 31, 1947, the company had an order backlog of \$5,500,000, compared with \$4,500,000 as of Oct. 31, 1946.

During the past fiscal year, Foote added two new lines of standard power transmissions and other items to its line of products.

Lukens To Build New Soaking Pit

APPROVAL of an appropriation of \$266,000 for a new soaking pit to re-

place two regenerative pits which have been in service for more than 30 years has been voted by directors of Lukens Steel Co., Coatesville, Pa.

Construction will start immediately, and the pit will be completed within three or four months.

East Chicago Foundry Still Unsold

ONE of the Chicago area's few remaining unoccupied war plants—the steel foundry at East Chicago, Ind., identified with Continental Foundry & Machine Co. during the war—is still without an industrial operator. Otto G. Klein, WAA regional director, announced last week that no bids were received when the plant was offered recently. Attempts are again being made to sell or lease it through direct negotiations, and interested parties are requested to contact Mr. Klein at Navy Pier, Chicago.

Television Output Soars in 1948

MORE than 975,000 television receivers were produced in 1948, bringing the postwar total to at least 1,160,000, Radio Manufacturers Association reports.

Television production reached a new high in December at 161,179 sets. This was only 17,500 under the output of television receivers in all 1947.

Total production of all radio receivers last year was 20 per cent below the high output in 1947.

Briefs...

Paragraph mentions of developments of interest and significance within the metalworking industry

United Brass & Aluminum Co., Port Huron, Mich., purchased in February, 1947, by Gray Marine Motors Co., Detroit, from the estate of the late Jacob S. Goldman, has been sold to Paul Weiner of Weiner Foundry Co., Muskegon, Mich. The Port Huron plant will be dismantled, some equipment transferred to Muskegon and the rest sold or scrapped. Major equipment includes two small cupolas, one 2000-pound electric furnace and eight 1000-pound crucible furnaces.

Strand Building Products Co., previously a subsidiary corporation of Detroit Steel Products Co., becomes Strand Garage Door Division of Detroit Steel, with offices at 2250 E. Grand Blvd., Detroit. Management and sales policies remain the same.

Keystone Driller Co., Beaver Falls, Pa., manufacturer of drilling and excavating machinery, has formed an Equipment Division, with offices at 419 Wood St., Pittsburgh. The division's first product will be a 15 to 25-ton-capacity self-propelled crane carriage on pneumatic tires for all makes of cranes. Keystone has contracted for the exclusive manufacturing rights to all designs and products of Robert H. Fox & Associates, Van Nuys, Calif., engineering group specializing in this machinery.

Tracy Mfg. Co., Pittsburgh, has appointed Frank & Scanlan Inc., Chicago, as a distributor in the Chicago area of Tracy kitchen cabinets and sinks.

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American Transit Association reports that 8000 new vehicles worth \$155 million were added to American transit systems during 1948. About 91,700 vehicles are owned by the industry, a small drop from the 92,407 at the end of 1947. There was a 41 per cent increase in trackless trolley coach deliveries in 1948 over 1947, a 20 per cent decrease for streetcars and a 42 per cent drop in deliveries of busses.

Bureau of Mines reports that the coal industry's death rate in 1948 was 1.56 per million tons of coal mined, lowest since records were begun in 1910.

ATF Inc., Elizabeth, N. J., has purchased the assets of Roll Forming Co., Fullerton, Calif., manufacturer of tubular chromed steel furniture. These

products will supplement the line of another ATF subsidiary, Daystrom Corp., and will be marketed on the West Coast as in the past. Roll Forming's present management will be continued.

R. G. LeTourneau Inc., Peoria, Ill., manufacturer of earthmoving and construction equipment, produced its 75,000th power control unit last month at its Peoria plant. This unit actuates earthmoving tools towed by or mounted on tractors.

Wilkie Die Products Co. is circulating a weekly bulletin listing the location, condition and prices of available forging material and equipment. Any firm that hot works metal either in hammers, presses or upsetters may receive the bulletin by contacting Wilkie at 1182 Hawthorne Blvd., Grosse Pointe Woods, Mich.

500.000 SEE STEEL PLANTS

LAST year almost 60 steel companies held "open house," attracting an aggregate attendance of 500,000 people. Many "open house" programs are planned for this year, too, as well as a general increase in all phases of the steel industry's efforts to apprise the nation of how it operates, what it can and cannot do, and the importance of its contributions to the country's welfare.

Yoder Co., Cleveland, has opened a branch plant at 1461 E. Eight Mile Rd., Ferndale, Mich., to furnish rolls and tooling to the Detroit area.

General Electric Co. has a 3,500,000-volt electrostatic accelerator under construction at its General Engineering & Consulting Laboratory for the Brookhaven National Laboratory, Upton, N. Y.

Nottingham Steel Co., Cleveland, warehousing firm for steel, aluminum and expanded metal, has completed a new warehouse which adds 15,000 sq ft to existing facilities.

Fairchild Engine & Airplane Co., New York, has licensed Continental Motors Corp., Detroit, to use its Al-Fin bonding process. Continental will use the process in manufacturing a new series of light-weight, aircooled gasoline engines designed to power U. S. Army vehicles.

Minnesota Mining & Mfg. Co., St. Paul, Minn., has resumed production of Scotch No-Mar protective tape for the first time since 1941. The tape is designed to protect stainless steel against die marks and other scratches during fabrication.

Marcus Transformer Co. Inc., Hillside, N. J., has appointed W. R. Hendrey Co., Seattle, as representative for Washington and Oregon.

Upson Co., Lockport, N. Y., manufacturer of laminated wood fiber wall and ceiling panels, is distributing to its jobbers and dealers the current annual edition of a "Business Booms and Depressions" chart which traces the fluctuations in economic progress, etc., since 1794. A copy may be obtained by sending 25 cents to Upson Co., Lockport.

National Metal Trades Association has reprinted its "Open House in Industry," a manual on entertaining in industrial-community relations. The 36-page publication may be obtained for \$1 per copy from NMTA, 122 S. Michigan Ave., Chicago.

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Bureau of Mines has released a circular describing improvements in equipment design and modification of some processes which will reduce plant construction costs and cut gasoline-manufacturing costs in a 30,000-barrel-a-day plant for converting coal to synthetic liquid fuels by hydrogenation. Gasoline manufacturing costs would be about 14.3 cents per gallon.

Timken Roller Bearing Co., Canton, O., has purchased a defense plant at 1025 Cleveland Ave., Columbus, O., as well as other units in Canton, Wooster and Zanesville, O., from WAA for \$3,243,707. Timken had been occupying these facilities during and since the war.

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Euclid Machine & Tool Co., a partnership, has been dissolved and a new corporation formed, Euclid Universal Machine Inc., for the manufacture of speed reducers and other products. The address, 15002 Woodworth Rd., Cleveland, remains the same. Fred Sneller is president.

Foxboro Co., Foxboro, Mass., maker of industrial instruments, has begun work enlarging its Pittsburgh plant. The addition, to be occupied in the early spring, will be used for the assembling of control valves and for warehousing.

The Business Trend

INDUSTRIAL activity as measured by STEEL's index leveled off at 173 per cent (preliminary) of the 1936-1939 average in the week ended Jan. 29, following its gradual rise in the first few weeks of the year. The index for the latest week matches the preceding week, is 10 points higher than a year ago but falls short of the average maintained during the last quarter of 1948.

PRODUCTION—The Federal Reserve Board's seasonally adjusted industrial production index declined to 192 per cent of the 1939 average in December from 195 in November. This falling off in the level of production was due to reduced output of nondurable goods which was at a rate about 2 per cent below the preceding month. The index for 1948, however, was 5 points higher than in 1947, climbing to 192 per cent of the 1939 average.

STEEL—Although production of steel for ingots and castings during the week ended Jan. 29 fell off half a point from the preceding week to 99.5 per cent of capacity, output for the month may set another alltime high as a result of weekly operations which were at or near record levels. It is certain, at least, that a new January mark will be set.

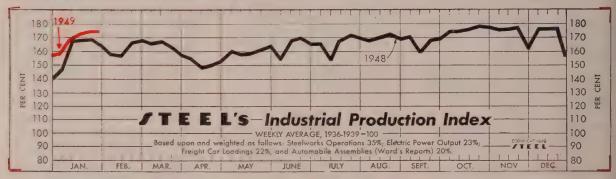
AUTOMOBILES — Outturn of passenger cars and trucks rose to 115,512 during the week ended Jan. 29, marking the fourth consecutive advance since Jan. 1. This steady advance seems certain to be stemmed, however, because of the transition to 1949 models by a leading producer. Production for January is

BAROMETERS of BUSINESS

estimated at 460,500 units and predictions for February call for a total of 448,500 passenger cars and trucks with capacity production not expected until March when new model building finally reaches high volume.

PRICES—Further decline was experienced by the Bureau of Labor Statistics Consumers' Price Index which dropped to 171.4 per cent of the 1935-1939 average in the period from Nov. 15 to Dec. 15. The mid-December level represents a decline of 0.5 per cent from a month earlier but is 2.6 per cent higher than in December, 1947. The bureau's weekly wholesale prices also continued their steady downward trend with the index for the week ended Jan. 25 skidding another 0.3 per cent to 158.8 per cent of the 1926 average, 5.7 points below the year ago level.

POWER—Sales of electric energy totaled 238.9 billion kilowatt hours in the 12-month period effedd Nov. 30, about 23.5 billion kilowatt hours more than in the corresponding period ended Nov. 30, 1947, according to Edison Electric Institute. Revenues for the period were \$4,274,644,900, an increase of 12.1 per cent over the corresponding period a year earlier. PETROLEUM—Stocks of all oils at the end of 1948 were estimated to be about 602 million barrels by the Bureau of Mines. Thus, the increase in stocks amounted to about 101 million barrels during the year, including a gain of 21 million barrels in crude oil stocks and about 80 million barrels in product stocks.



Index (chart above): Week ended Jan. 29 (preliminary) 173 Previous Week 173 --- Month Ago 156 Year Ago 163

Month Year Latest Prior INDUSTRY Period* Week Ago Ago Steel Ingot Output (per cent of capacity)† Electric Power Distributed (million kilowatt hours) 99.5 100.0 97.5 95.5 5,810 5,769 5,562 5,429 Bituminous Coal Production (daily av.—1000 tons) Petroleum Production (daily av.—1000 bbl) Construction Volume (ENR—Unit \$1,000,000) 1,903 1,589 2,033 1,980 5,419 5,439 5,611 5.318 \$212.2 \$96.6 \$78.1 \$99.7 Automobile and Truck Output (Ward's-number units) 115,512 113,820 81,968 101,044 * Dates on request, †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons

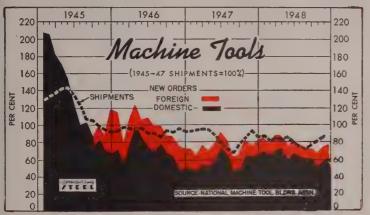
710 142 $$27,717$ $+5%$	585 128 \$28,324 + 32%	727 91 \$28,086 +3%
	\$27,717	142 128 \$27,717 \$28,324

Iron Ore

(Lake Superior Iron Ore Assn.) Gross tons—000 omitted

	Consumption		Lake Er	ks at ie Docks irnaces
	1948	1947	1948	1947
Jan	7,057	7,024	29,081	30,514
Feb	6,440	6,264	22,628	24,317
Mar	6,634	6,679	16,022	17,411
Арг	4,976	6,579	17,125	13,555
May	6,656	6,885	22,058	17,618
June	6,577	6,500	26,965	21,746
July	6,479	6,156	32,611	28,440
Aug	7,036	6,638	37,081	33,896
Sept	6,965	6,492	40,923	38,370
Oct	7,273	7,151	43,883	41,641
Nov	7,058	7,068	45,160	43,010
Dec	7,351	6,970	39,460	36,095
Total	80,504	80,807		





Machine Tools

(1945-47 Shipments=100)

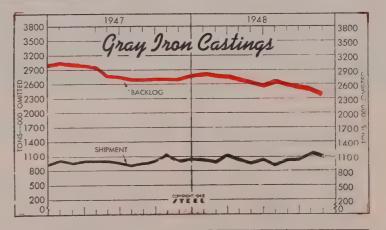
					Shipm	ents
	-	-Ord	lers-		(3 Mos.	Ave.
	Total Domestic		estic	Cente	red)	
	1948	1947	1948	1947	1948	1947
Jan.	 83.1	71.7	69.1	50.7	86.9	93.1
Feb.	 77.3	63.8	64.6	48.0	81.9	94.8
Mar.	 86.3	74.3	70.2	54.2	84.2	95.4
Apr.	 86.3	69.8	72.2	51.0	82.7	94.3
May	 73.5	76.9	62.1	60.6	86.3	88.9
June	 83.4	90.9	71.5	73.7	79.9	79.5
July	 74.0	81.1	61.1	64.4	75.3	71.0
Aug.	 73.7	62.1	60.9	47.5	72.3	68.6
Sept.	 73.1	63.7	61.5	49.0	78.3	78.5
Oct.	 67.4	81.0	53.4	65.0	80.2	85.5
Nov.	 72.2	75.6	54.5	64.1	84.5	92.6
Dec.	 76.7	81.1	60.5	66.3		86.1

Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted					
	Ship	ments	Backlogs*		
	1948	1947	1948	1947	
Jan	1,064	1,078	2,803	3,021	
Feb	1,024	1,010	2,769	2,987	
Mar	1,169	1,090	2,726	2,979	
Apr	1,051	1,097	2,691	2,909	
May	993	1,097	2,602	2,783	
June	1,072	1,038	2,587	2,711	
July	914	913	2,601	2,657	
Aug	1,051	952	2,599	2,631	
Sept	1,088	1,025	2,587	2,680	
Oct	1,148	1,154	2,523	2,669	
Nov	1,100	1,020	2,407	2,687	
Dec		1,066		2,782	
Total		12,541			

^{*} Unfilled orders for sale to the trade.



Bank Clearings (Dun & Bradstreet—millions) Federal Gross Debt (billions) Bond Volume, NYSE (millions) Stocks Sales, NYSE (thousands) Loans and Investments (billions)† United States Gov't. Obligations Held (millions)† † Member banks, Federal Reserve System.	Latest	Prior	Month	Year
	Period*	Week	Ago	Ago
	\$13,907	\$13,731	\$13,682	\$14,033
	\$252.4	\$252.3	\$252.3	\$256.6
	\$17.0	\$19.5	\$16.7	\$22.8
	4,681	4,107	7,027	4,575
	\$62.9	\$62.6	\$63.1	\$65.5
	\$33,749	\$33,324	\$33,455	\$37,886
PRICES STEEL's Composite Finished Steel Price Average STEEL's Nonferrous Metal Composite; All Commodities; Metals and Metal Products; + Bureau of Labor Statistics Index, 1926=100. \$1936-1939=100.	\$97.77	\$97.77	\$95.50	\$78.59
	232.6	232.6	232.6	189.5
	158.8	159.3	162.2	164.5
	177.9	175.3	173.7	154.6

Men of Industry



FRED L. FOX

Superior Steel Corp., Carnegie, Pa., announces appointment of Fred L. Fox as assistant general manager of sales in charge of clad metal sales. He has been Pittsburgh district sales manager since 1946, and previous to that time was Superior's sales manager in Chicago.

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De Laval Steam Turbine Co., Trenton, N. J., announces appointment of Walter Rahel as advertising manager. Prior to joining De Laval Steam Turbine Co. he was with Ingersoll-Rand Inc. in its advertising department.

R. J. Schuler has been appointed vice president, Cauhorn Distributing Co., Detroit. He has been general manager of sales for the past two years. During the war he was general manager, Hampshire Products Inc., Milan, Mich., and has also served as assistant general manager of sales for Republic Steel Corp., Bolt & Nut Division, Cleveland, and general manager of sales, LaSalle Steel Co., Chicago.

Gage Structural Steel Co., Chicago, division of Allied Structural Steel Cos., announces retirement of Frank E. Swanson, treasurer, director and one of the founders of the company. Officers elected for 1949 are: R. H. Gage, president, J. D. Gage, vice president, and F. S. Saiger, secretary-treasurer.

Edward J. Hrdlicka has been appointed vice president of Hydraulic Equipment Co., Cleveland. Associated with the company for over 12 years, he was recently chief engineer, and subsequently vice president in charge



ERWIN J. SCHMIEL

of engineering. Harold J. Zimmerman, vice president, has resigned to re-enter the field of industrial engineering as an independent operator.

Erwin J. Schmiel and Ralph O. Wirtemburg have been appointed secretary-treasurer and sales manager of Norma-Hoffman Bearings Corp., Stamford, Conn. Mr. Schmiel succeeds Edward C. Lennon, retiring after 35 years of service. Mr. Wirtemburg succeeds Frederick W. Mesinger, resigned, and becomes sales manager after serving as eastern regional sales manager, New Departure Division, General Motors Corp. Mr. Schmiel was most recently general auditor, Elastic Stop Nut Corp.

Maj. Gen. Walter A. DeLamater (ret.) has been elected a vice president of Heli-Coil Corp., Long Island City, N. Y.

Sam S. Mullin has been elected president, Cleveland Pneumatic Tool Co., Cleveland, which he joined last June when he resigned from Textron Inc. to become vice president of Cleveland Pneumatic Tool Co., and two months later, executive vice president in charge of all operations.

Frank R. Sargeant, formerly secretary-treasurer, Yoder Co., Cleveland, has been promoted to executive vice president and treasurer. Douglas O. Yoder was elected assistant to the president, and Edmund H. Kanzenbach, secretary of the company.

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H. F. Sinclair has resigned as president, Sinclair Oil Corp., New York, and has been elected chairman of the board of directors. P. C. Spencer,



RALPH O. WIRTEMBURG

president of the company's principal operating subsidiary, Sinclair Refining Co., since 1947, has been elected to succeed Mr. Sinclair as president.

Sterling Grinding Wheel Division, Tiffin, O., Cleveland Quarries Co., announces appointment of three new engineers to its technical staff. Robert G. Fries and George Brannick Jr. will work in the laboratory as part of the company's new research and development program, and John B. Riddle assumes the duties of plant engineer.

Hydropress Inc., New York, builder of heavy hydraulic machinery and rolling mills, has appointed Carl E. Haugh district sales manager of its Eastern and Midwestern Divisions. He has been a sales engineer with the company for the past three years.

Black & Decker Mfg. Co., Towson, Md., announces several shifts in its field personnel. James F. Moore, service engineer, Chicago branch, has joined the Chicago sales department as sales engineer; T. J. Waters has been appointed service engineer at Chicago. W. E. Boyles, service engineer, New Orleans branch, has been transferred to the Cleveland branch as sales engineer, and R. B. McClellan has been appointed service engineer at New Orleans. Thomas Rogers has been promoted to a sales engineer at the Dallas branch.

Edward E. Ford has been elected a director of International Business Machines Corp., New York.

Earl L. Bosley has been appointed Cleveland division sales manager,



MAKING THE BIG CHIPS FLY!

Sunoco Emulsifying Cutting Oil Is Used for Rough-Finishing of Heavy SAE 3140 Forgings

The correct cutting fluid is a big factor in the continuous heavyduty machining of tough steel forgings on the machine shown above.

Machine: Warner & Swasey 4-A Heavy-Duty Turret Lathe

Material: SAE 3140 Forging

Operation: Roughing-Out Cap for Pile-Driving Machine

Cutting Fluid: 1 part Sunoco Emulsifying Cutting Oil to 20 parts water Sunoco Emulsifying Cutting Oil is a viscous, self-emulsifying oil that quickly and easily forms a stable emulsion with water. It contains no animal or vegetable fats, and will not turn rancid.

Sunoco Emulsifying Cutting Oil meets the demand not only of tough cutting jobs, but also of a wide range of turning, milling and grinding operations calling for close tolerances and fine finishes. It is particularly efficient where precision machining at high cutting speeds is demanded.

For full information, for samples to test on your own machines, for the services of a cutting oil specialist, call your nearest Sun office. Or write Department S-2.

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SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY



Apex Electrical Mfg. Co., Cleveland. He formerly was sales manager for Northern Ohio Appliances Inc., Cleveland.

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Edward F. Coogan has been elected president of Autocar Co., Philadelphia, succeeding Robert F. Page Jr. Mr. Page was elected chairman of the board, and continues a director.

John R. Bartizal has become executive vice president, Clearing Machine Corp., Chicago, manufacturer of metal forming presses. He has been treasurer of the company.

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William T. Strickland Jr., sales engineer in the Steel & Tube Division, Timken Roller Bearing Co., Canton, O., will be stationed in the Houston sales office. He formerly was in the Chicago office.

Willis B. Clemmitt has been elected a vice president, Freyn Engineering Co., Chicago. He has been associated with the company since 1923, and has served a considerable number of years as chief engineer.

American Steel Foundries, Chicago, announces election of officers for 1949: Thomas Drever, formerly president, was elected chairman of the board; C. C. Jarchow, formerly vice president, elected president; C. E. Grigsby, formerly assistant vice president, elected a vice president; L. T. Moate, formerly assistant to controller, elected an assistant controller. All other officers were re-elected.

E. Bruce McEvoy Jr., formerly assistant manager, Eastern Division, equipment tubes sales, has been appointed east central manager of distributor sales for the Radio Tube Division, Sylvania Electric Products Inc., New York. Dr. J. R. Dedrick,

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C. C. JARCHOW

formerly associate professor of powder metallurgy at the University of Cincinnati, has been appointed section head of the advanced development group at the metallurgical research laboratories of Sylvania.

American Car & Foundry Co., New York, announces appointment of Nelson C. Walker as district manager of the Berwick, Pa., plant, succeeding Justus W. Lehr, who has been granted an extended leave of absence.

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E. A. Correa has been elected secretary of Armco Steel Corp., Middletown, O. In addition he will retain his responsibilities of legal counsel for the company. Mr. Correa succeeds W. D. Vorhis, who is retiring as secretary, a position he has held since 1928.

Thempson-Bremer & Co., Chicago, announces election of Henry T. Chamberlain as president of the company, succeeding Arthur H. Thompson, founder of he company, who has been elected chairman of the board of directors. Other officers elected are: William J. Dunn, vice president; Joseph M. Griffen, secretary, and Walter M. Neuman, comptroller. For the past nine years Mr. Dunn has been an executive of the Hydraulic Division of New York Air Brake Co. in Chicago.

Stewart Kerr, Detroit attorney, has been appointed executive secretary, National Association of Engineering Companies.

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Charles S. Dennison has been appointed assistant general sales manager, Willys-Overland Motors Inc., Toledo, O. E. L. Anderson, former field representative for the Southwest, has been named the company's sales promotion manager to succeed Mr. Dennison. F. F. Baldwin, former midwestern field representative, has been placed in charge of the truck section, truck and equipment sales department.

Herman Hoyler was named industrial manager, East Orange, N. J., district office, Brown Instruments Division, Minneapolis-Honeywell Regulator Co.

William L. McGrath, president, Williamson Heater Co., Cincinnati, has been elevated from vice president to president of the Cincinnati Chamber of Commerce.

—o— Franklin Thomas, professor of civil engineering and dean of students at California Institute of Technology, Pasadena, Calif., was named president, American Society of Civil Engineers for 1949.

Charles T. Morgan has been appointed New England sales representative of Sperry Products Inc., Danbury, Conn.

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Three men named to positions in the Atomic Power Division, Westinghouse Electric Corp., Pittsburgh, are: Philip N. Ross, appointed assistant director of research; E. L. Kuno, named assistant to the division manager; and L. C. Mechling Jr., appointed works engineer. William C. Hipple has retired as manager of the Trenton, N. J., Lamp Division of the company, after 30 years in that post.

Promotions in the sales department of Weirton Steel Co., Weirton, W. Va., include: A. C. Childs, district sales manager, New York, made assistant vice president, succeeding W. R. Cunnick, recently appointed vice president and general manager of sales, Great Lakes Steel Corp., Detroit. Mr. Childs will be located in Weirton. Robert B. Sanders, district sales manager, Philadelphia office, made district sales manager in New York. James N. Talbott, sales manager, Philadelphia office, made district sales manager, succeeding Mr. Sanders. W. A. Fannin, manager of sales, Sheet & Strip Division, made assistant general manager of sales of all products, and F. G. Brown, promoted from assistant manager of the Sheet & Strip Division, to manager of that division. ---0---

E. A. Brugger has been named vice president in charge of production for Koehring Co., Milwaukee. A veteran of 32 years' service with Koehring, Mr. Brugger for the past ten years



E. A. BRUGGER



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IMORE, MARYLAND
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ew England Metallurgical Corporation
orter Forge & Furnace, Inc.
GEPORT, CONNECTICUT
ommercial Metal Treating, Inc.

ura-Hard Steel Treating Company indberg Steel Treating Company erfection Tool & Metal Heat Treating Co.

ne Cincinnati Steel Treating Company te Queen City Steel Treating Company FLAND OHO

(ELAND, OHO
he W. S. Bidle Company
commercial Steel Treating Company
he Lakeside Steel Improvement Company
he George H. Porter Steel Treating Co.
TON OHIO

he Dayton Forging & Heat Treating Co. he Ohio Heat Treating Company

nderson Steel Treating Company ommonwealth Industries, Inc. ELIZABETH, NEW JERSEY

Ace Heat Treating Company
HARTFORD, CONNECTICUT

The Stanley P. Rockwell Company

HOUSTON, TEXAS

Cook Heat Treating Company

NDIANAPOLIS. INDIANA
Metallurgical Service Company, Imee

Cook Heat Treating Corporation

Wesley Steel Treating Company

Metallurgical Control Laboratories

Fred Heinzelman & Sons
Alfred Heller Heat Treating Company
Metro Heat Treat Corporation
Precision Heat Treating Company

NEWARK, NEW JERSEY
B-M Heat Treating Company
Bennett Steel Treating Company
L-R Heat Treating Company

OAKLAND, CALIFORNIA Industrial Steel Treating Company

PHILADELPHIA, PENNSYLVANIA
Metlab Company
J. W. Rex Company
Wiedemann Machine Company
Robert Wooler

TTSBURGH, PENNSYLVANIA
Ferrotherm Company

Pittsburgh Commercial Heat Treating C CINE WISCONSIN

Harris Metals Treating Company Spindler Metal Processing Compan

ROCK ISLAND, ILLINOIS

C. U. Scott & Son, Inc.

ROCKFORD, ILLINOIS

Eklund Metal Treating, Inc

SYRACUSE, NEW YORK

Syracuse Heat Treating Corporation

WORCESTER, MASSACHUSETTS

METAL TREATING INSTITUTE

has been general manager of Parsons Co., a subsidiary located in Newton, Iowa. E. O. Martinson has been transferred to Koehring from C. S. Johnson Co., Champaign, Ill., another subsidiary, where he was general manager. He assumes the duties of chief engineer. E. W. Maas was named vice president and general manager, Kwik-Mix Co., the third Koehring subsidiary, Port Washington, Wis. R. A. Beckwith, vice president, will devote his full time to engineering development work at Koehring and its three subsidiary companies. F. H. Heine, vice president, will serve as director of foreign operations and utility officer.

In honor of its retiring president, Wilfred Sykes, president, Inland Steel Co., Chicago, the officers, directors and senior councilors of the Chicago Association of Commerce & Industry have established in perpetuity a citizenship award at the Glenwood School for Boys, Glenwood, Ill., of which Mr. Sykes has been president since 1947.

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Lamar J. Otis has been named general accountant of the Pittsburgh Steel Co., Pittsburgh.

Roland S. Withers has been appointed director of customer research section, General Motors Corp., Detroit, on the distribution staff. He will succeed the late Henry G. Weaver.

Betty M. West, assistant purchasing agent, Dearborn Stove Co., Dallas and Chicago, has been named purchasing agent of the company.

T. C. Glenn has been appointed manager, Engineering Division of the newly created Michigan district of General Electric Co. His headquarters will be at Detroit. Kenneth J. Barlow was appointed manager of sales administration for the Plastics Division, Chemical Department of the company, at Pittsfield, Mass.

Fehl J. Shirley has been named assistant manager, Titanium Division, National Lead Co., with headquarters at St. Louis. He has been manager of industrial relations for the past year.

H. L. Smith has been appointed to the newly created position of executive technical engineer, Federated Metals, division of American Smelting & Refining Co., New York.

August F. Ihde has been named vice president in charge of automotive



CHESTER F. CONNER

sales, Fedders-Quigan Corp., Buffalo. Anthony J. De Fino succeeds Mr. Ihde as sales manager of the Automotive Division.

Chester F. Conner has been appointed manager of the industrial products sales department, Industrial & General Products Division, B. F. Goodrich Co., Akron. Donald W. Gates has been appointed manager of advertising and sales promotion. Associated Lines Sales Division, succeeding Jay E. Miller, who was named to a recently created post as western public relations manager, Los Angeles. Clyde D. DeLong was named manager of the plastic products sales department, which will be moved from Akron to the company's plastic products plant near Marietta, O. Transferring to that location will be W. M. Gaston and R. W. Wisnom, who will handle consumer markets; R. L. Hill, R. R. Speicher and C. J. Mischler, handling industrial markets: and N. P. Singleton, handling packaging markets. L. H. Chenoweth will remain in Akron on special assignments for the plastics depart-, ment, and E. L. Byan has been transferred to the special industrial merchandise department of the Industrial & General Products Division. ---0--

Charles M. Dunn Jr. has been appointed assistant manager of the direct sales department, Glidden Co., Cleveland. He has been Cleveland technical service department director since 1947.

McKinsey & Co., management consultant, New York, announces appointment of Everard E. Lawrence as a member of its personnel group.

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John D. Saussaman, blast furnace superintendent, Fontana, Calif., plant of Kaiser Co. Inc., will receive the 1949 J. E. Johnson Jr. Award of the American Institute of Mining & Metallurgical Engineers, to be presented at an AIME banquet in San Francisco, Feb. 16.

Dan O'Madigan Jr. has been appointed assistant general sales manager, Pontiac, Mich., for the Pontiac Motor Division, General Motors Corp.

American Coach & Body Co., Cleveland, announces the following sales appointments: Paul V. Dimmick succeeds Deming Bronson as Central Division sales manager, with headquarters at Cleveland. Mr. Bronson has resigned, and will return to the West Coast to engage in the lumber business. Assisting Mr. Dimmick will be Arthur C. Frank, to cover Michigan, Indiana and Kentucky, with headquarters in Cleveland. Mr. Dimmick will cover Ohio, western New York, western Pennsylvania and West Virginia.

Leyshon W. Townsend has accepted the position of assistant to the president, American Cladmetals Co., Carnegie, Pa. He was formerly associated with Lukens Steel Co. and Jessop Steel Co. He is also a director of the Composite Steels Inc.

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Harry D. Sweeney has been appointed sales manager of welding products for the American Manganese Steel Division, American Brake Shoe Co., New York. He will continue to be located at the division's headquarters in Chicago Heights, Ill.

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Frank E. Peterson has been promoted to manager of the Milwaukee office of Wyandotte Chemicals Corp., where he has been assistant manager for the past year. Fred R. Hayden takes over the Milwaukee territory.

R. C. Ferguson has been appointed north central district manager, Hardinge Co. Inc., York, Pa. He will have headquarters at Hibbing, Minn.

Chicago Chapter, Steel Products Warehouse Association Inc., Cleveland, has elected the following regional officers for certification to the forthcoming spring conference of the national organization: Sol Fox, Universal Sheet & Strip Steel Co., president; P. A. Riskind, Chicago Metals Co., vice president; H. A. Greenberg, Western Sheet Steel Co., treasurer; and D. L. Friedman, Friedman Bros. Steel Co., secretary.

Truck-Trailer Manufacturers Association Inc., Washington, has elected the following officers for 1949:

President, Harrison Rogers, Rogers Bros. Corp., Albion, Pa.; western vice president, John C. Bennett, Utility Trailer Mfg. Co., Los Angeles; eastern vice president, W. E. Grace, Hobbs Mfg. Co., Fort Worth, Tex.; and treasurer, C. A. Persinger, Wilson Trailer Co. Inc., Sioux City, Iowa.

J. Stoneking has been appointed advertising and sales promotional manager, General Box Co., Chicago.

Standard Transformer Co., Warren, O., announces appointment of Robert P. Smith as its representative in Florida.

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Walter S. Gifford, chairman, American Telephone & Telegraph Co., has been elected a director and a member of the finance committee, United States Steel Corp. Mr. Gifford, who was a member of the U. S. Steel board from 1928 to 1939, fills a vacancy that has existed on the board since the death of Thomas Lamont, chairman of J. P. Morgan & Co.

Irving A. Duffy, since 1946 associated with International Harvester Co., Chicago, latterly as director of wage administration, has been named director of purchasing for Ford Motor Co., Dearborn, Mich. Carl F. Unruh will

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LEWIS E. ZENDER

Appointed director of public relations, American Steel & Wire Co., Cleveland. Noted in STEEL, Jan. 31 issue, p. 48

continue as general purchasing agent, and H. H. Foster in the same capacity at Lincoln-Mercury Division. Mr. Duffy fills the position at Ford left vacant since the death of Albert J. Browning last July.

Orrin B. Werntz will assume, Mar. 1, the duties as managing director and counsel for Pressed Metal Institute, Cleveland. He also will continue as executive secretary of National Screw Machine Products Association, Cleve-



L. S. MacKAY Appointed director of purchases, Kaiser-Frazer Corp., Ypsilanti, Mich. Noted in STEEL, Jan. 31 issue, p. 52

land. Mr. Werntz has had more than 10 years' active participation in trade association management and program development in the metalworking field. He has been selected as a successor to Tom J. Smith Jr., who resigned as president of the institute Oct. 1, 1948. Jerry Singleton, associated with Pressed Metal Institute since 1947, continues as assistant manager. Effective Mar. 1 the institute will have its offices at 13210 Shaker Square, Cleveland.

OBITUARIES . . .

Harry G. Leighton, 69, for many years manager of the Philadelphia office of Brown & Sharpe Mfg. Co., died Jan. 18. He retired from this position December, 1946, after more than 40 years of service with the company.

Arthur T. Waterfall, 79, former president of Dodge Bros. Inc., Detroit, and widely known in the foundry industry, died in Detroit, Jan. 29. For 25 years he was identified with Russell Wheel & Foundry Co., Detroit, serving for eight years as general superintendent. Later he became traffic commissioner for the Detroit Board of Commerce and traffic manager for Dodge, rising to the presidency of the motor company in 1928 before it was absorbed by Chrysler Corp. He retired shortly afterward and had spent much of his time in California.

A. E. Ruemmele, 59, chief engineer, Jay J. Seaver Engineers, Chicago, died Jan. 30 of a heart attack.

Hugo L. Olson, 70, president and general manager, Sundstrand Machine

Tool Co., Rockford, Ill., died Jan. 31. He also was a director of George D. Roper Corp., Rockford.

Col. Joseph A. Pelot, U. S. A. (ret.), 63, executive assistant to the president, Crompton & Knowles Loom Works, died Jan. 29 after a short illness. He joined the loom works staff in 1923 upon retiring from the Army.

Walter R. Leuschner, 70, designer of the first German automobile in 1904 and later creator of the Napoleonic coach trademark of the Fisher Body Division, General Motors Corp., died in Detroit, Jan. 29.

Francis Davidson, founder and president, Davidson Enamel Products Co., Lima, O., died Jan. 24 after a long illness.

James B. Thorpe, 66, executive vice president and director, Climax Molybdenum Co., New York, died Jan. 29.

John F. Kelly Jr., 57, export sales manager, Electric Storage Battery Co., Philadelphia, for the past 24 years, and an employee of the company for 40 years, died in Newark, N. J., Jan. 25.

Henry A. Van de Motter, 55, former production manager for Hope Metal Products Co., Cleveland, died Feb. 1.

W. W. Elliott, 70, who retired last summer as head of Elliott Mfg. Co., Binghamton, N. Y., died recently.

Joseph M. Usher, 60, vice president, Merrill & Usher Co., Worcester, Mass., died Jan. 26, in Dunedin, Fla., where he had been spending the winter because of ill health.

Francois de Wendel, 75, a leading personality of the French iron and steel industry, died in Paris Jan. 13.

Ernst N. Nindeman, 52, associated with Sperry Gyroscope Co., Great Neck, L. I., died Jan. 26.

Albert Strous, 62, former head, Strous Iron & Steel Co., Ashland, O., died Jan. 20.

A. Robert Shallanda, 49, purchasing agent for Le Roi Co., Milwaukee, died Jan. 25 after a short illness.

Choosing the Right Stock Drill •Cuts Your Cost Per Hole •Eliminates Breakage Speeds Production Yes, there are many advantages in selecting the right drill for each job. � For instance, one of our customers was getting excessive breakage with regular jobbers' length drills on the set-up pictured here -drilling holes 7/16 inch deep in stainless steel. A Cleveland Service Representative was able to correct this situation by recommending a stub screw machine drill which, because of its heavier construction and shorter length, is giving complete satisfaction. �Your drilling problems, too, perhaps can be solved by a Cleveland Service Representative - without cost or obligation. Contact our nearest Stockroom, or . . . Telephone Your Industrial Supply Distributor 1242 East 49th Street Cleveland 14, Ohio Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5 Los Angeles 11 . London W. 3, England ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER CLEVELAND TOOLS

Engineering News

"WHITTLES" THREE BLOCKS PER MINUTE— At Ford, finishing of the head gasket surface on 6-cylinder cast iron engine blocks is performed in one pass on a special broaching machine developed by Oilgear Co., Milwaukeee. In processing three blocks per minute, the unit removes about 0.015-inch of stock from each block. Blocks are brought to the machine's loading position by a conveyor. Inverted carbide tipped tools of the tunnel-type horizontal machine, fastened to the underside of the bridge, complete the finishing job on each block as it travels toward the unloading platform and conveyor.

WIDENS TRUCK FLEXIBILITY— Latest automatic transmission to be included on a gas-powered industrial truck revealed recently by Clark Equipment Co., Battle Creek, Mich., eliminates necessity of a clutch and reduces considerably motions and operations required for driving. Power from the truck's engine is transmitted by the unit through magnetic induction. The magnetic inductive force is applied through an air gap and, as a result, there is no metal-to-metal contact between driving and driven members. Two rotors attachine do a special forward and reverse constant-mesh gearing are the driven members.

MAY AID CORROSION RESISTANCE— Corrosion resistance of nickel electrodeposits may be further improved with further researches since the discovery that porosity of electroplated nickel foil varies with the crystal structure of the deposit. According to the research committee of the American Electroplaters' Society, which reported the discovery, it is generally conceded that wrought foils are less porous than similar electrodeposited foils from commercial baths. Further work on the subject, however, may determine if nickel baths operating under commercial conditions can be modified to give a crystal structure with an improved corrosion resistance.

MILLION-DOLLAR TRANSFORMERS— Most heavily-guarded pieces of power equipment in the country—a dozen 15,000-volt General Electric transformers at the PG & E, Oakland, Calif., no longer hold their chief claim to fame. Their solid silver windings, utilized at the height of the wartime copper shortage, were recently removed and returned to the United States government. Already four of the units are back in service with conventional windings. The original million-dollar windings were borrowed from the government's cache in form of 70 pound bricks. These were melted into 350-pound bars which were worked into rectangular-shaped wire at GE's Pittsfield Works.

SLASHES SCALING—Besides speeding up the process of flanging automotive axle housings, recently installed induction heating equipment in the flange forging division of Midland Steel Products Co., Cleveland, also is instrumental in turning out consistently flawless flanges. Furthermore the use of clean induction heat is slashing scaling by some 75 per cent. In the forging operation, the induction equipment is reported to bring the steel tubing up to temperature so fast that there is no time for the heat to be conducted back to the area outside the induction coils. Break-off of hot forgeable metal and cold tubing is spread over less than ½-inch. The cold metal then bottlenecks the hot metal in the die, allowing it to "blossom" out into a perfect flange.

SIMPLIFIED HARDENING—Fixture used to induction harden a vital automotive part in the Studebaker plant, is instrumental in boosting the processing rate some 236 pieces per hour. Furthermore, it is flexible enough to handle several work sizes. Part involved is a clutch shaft with two fingers, ends of which require hardening after being brazed to the shaft. (p. 90)

THREE-IN-ONE JOB-Three operations are involved in turning out special condenser fins in Fedders-Quigan Corp.'s Buffalo plant. Work is done on a multistage fin press that operates so rapidly that an observer is conscious of only one operation. Actually, strip from which the fins are shaped is fed from uncoilers directly to the first of 3-stage dies of the press. In the first operation, perforations are made; in the second, the press slits the fin between each alternate pair of holes and, in the third station, each tube hole in the fin is flanged, and fin itself is severed from the traveling strip. (p. 92)

AID BOLT MAKERS—Testing methods developed by American Institute of Bolt, Nut and Rivet Manufacturers is expected to aid makers to standardize procedures so everyone gets comparable and reproducible results. For example, the elastic proof load test applicable to quenched and tempered bolts was devised to insure that the bolt will not take permanent set at tension loads up to the specified proof load. A value of 0.0005-inch of apparent permanent set is permitted. (p. 97)

OPEN HEARTH CHEMISTRY—Without a first-class chemical lab where samples are quickly and accurately analyzed, an open hearth department would be as bad off as a man with very poor blood circulation. This basic process accomplishes one purpose—it refines steel to make a marketable product. Open hearth refining is done through removal of impurities present in the scrap and pig iron charge. To make the open hearth function properly, the chemical lab performs three functions. (p.106)

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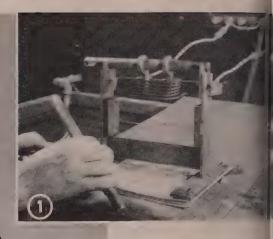
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INDUCTION HARDENING Automobile Parts



By WILLIAM J. HARRIS Chief Metallurgist Studebaker Corp. South Bend, Ind.

Rapid processing, uniform heating, absence of warpage are some of the advantages attending Studebaker's use of the process

APPLICATION of induction heating units, especially to engine and chassis components some of which require no further operations except assembly after heat treatment, have gradually been extended by Studebaker Corp. Advantages attained include rapid processing, uniform heating, freedom from warpage and ability to secure the desired depth of case while cores and other areas remain soft and ductile.

One of the simplest jobs done is that on a clutch shaft assembly, Fig. 1, having two fingers whose ends require hardening after the fingers are brazed to the shaft and the assembly is otherwise complete. For heating, the part is merely set in insulated V-notched supports with ends of the fingers inside an elongated coil of copper tube through which cooling water flows continuously.

Coil is energized by a 15 kilowatt induction unit. As soon as the finger ends are up to quenching temperature, current is shut off and the piece dropped into a water quench. Some 236 pieces per hour are thus hardened. As the shaft remains cool, there is no chance of warpage (such as occurred formerly when the whole assembly was furnace heated) and brazing is not affected. Different sizes of shafts are readily handled in this simple fixture.

Hardening of the threaded portion of the ends of steering knuckle upper arm supports is done in the setup, Figs. 2 and 3, there being two coils, one at each side of the central ring. Both coils are supplied with high frequency current from a 15 kilowatt General Electric electronic generator. Parts are forged from SAE 1040 steel and are completely machined before the thread-hardening operation.

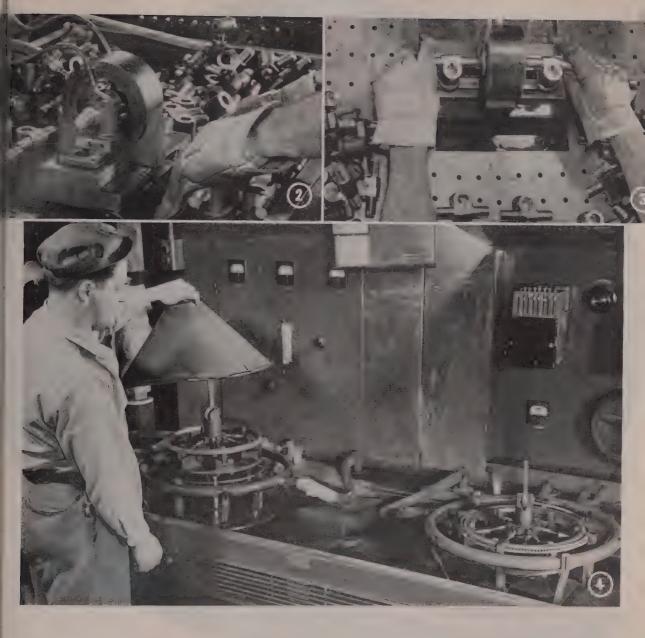
Forgings are handled in pairs, each forging being

set over a pin on a sliding block (one of which is shown clearly in Fig. 2). Both blocks are then pushed inward along flat ways of the fixture. This causes one threaded end of each piece to enter the coil on its side of the fixture. As each block has a flattened tongue that fits a slot in the fixture, the threaded ends are held coaxial with the coil, hence threads heat uniformly. Heating starts as soon as the operator pushes the blocks against stops, removes his hands and presses a button.

As soon as the threads are up to quenching temperature, current shuts off and water is turned on, both automatically. Jets are directed radially inward from the ring and the threads are quenched quickly and uniformly without warpage. Then the water is shut off automatically and the operator slides the blocks outward, turns them, with forgings, through 180 degrees and again pushes the blocks inward. When hands are withdrawn and the start button is pressed, the cycle just described is repeated on the second end, completing hardening of both threads of two pieces.

Total time per piece averages 10 seconds and results in a case that is about 0.030-inch deep, the core remaining soft. Hardness is held to 50 rockwell C, minimum.

Much larger work is handled in the setup on a twostation General Electric unit, Fig. 4. This machine is employed chiefly for hardening the teeth of starter ring gears about 12 inches in diameter but is also used, with different fixtures, for other work. Gears are produced from SAE 1042 bar stock rolled into a circle, butt welded, machined and has teeth cut to size before hardening.



When put in place, as at left in Fig. 4, the gear is held by chuck jaws expanded by a cam lever against the ring's inner diameter. When a starting button is pressed, the ring is lowered by hydraulic means into heating position inside a two-turn tubular copper coil and the chuck with the gear starts to rotate slowly and continues in rotation until again elevated for unloading. A conical cover is placed over the assembly merely to keep water spray from splashing about. When current is applied as part of a fully automatic cycle, the gear teeth are heated uniformly as the gear continues to rotate inside the coil.

As soon as teeth reach quenching temperature, the current is shut off and water under pressure is sprayed inward on the gear by radial jets from the ring supported outside the coil. As rotation makes both heating and cool- (*Please turn to Page* 128)

Fig. 1—Simple setup for induction heating ends of fingers bruzed to clutch release shafts. When correct temperature is attained, current is shut off and part dropped into water quench tank at left

Fig. 2—Closeup of fixture employed to induction heat threaded ends of forged knuckle upper arm supports. Locating pin is on a sliding block having a flattened tongue that fits slot in which tongue slides

Fig. 3—Top view of fixture for heating and quenching threaded ends of knuckle arm supports two at a time. Coil at each end of the sleeve is pierced so that jets of water are directed radially inward

Fig. 4—Setup in a two-station 50 kilowatt G.E. induction heater equipped with fixtures and coils that heat the teeth of starter ring gears as latter are rotated slowly inside quench rings. Stations are used alternately





Power-driven conveyors and other mechanized devices accelerate production of refrigeration components. Literally miles of steel fins and tubing are bonded daily in creating "custom" units for users

Speeds Output of Steel-Finned Condensers

BEHIND-the-scenes mechanical factor responsible for the high volume production of finned condensers in the Buffalo plant of Fedders-Quigan Corp., is the latest type roller hearth, controlled atmosphere brazing furnace. Combined with other up-to-date materials handling and processing equipment, it not only is aiding the company to join literally miles of steel fins and tubing in speed-up fashion, but also is saving vast quantities of materials over the old manual "solder dip" methods employed previously.

An important element in refrigeration, the condensers represent only part of the company's overall production. Besides supplying these units for equipment produced by domestic and commercial refrigeration manufacturers, the organization's radiator division also keeps several prominent automotive concerns well stocked with radiators.

Two Condenser Types Built—Condensers built by Fedders are of two general types—forced and natural draft. In the fabrication of the former, %-inch tubing is included as a continuous coil with approximately six fins per inch. It is used mostly in commercial refrigeration units. The second type makes use of ¼-inch tubing with fewer fins per inch, normally three to five, depending on the particular requirements of the user. Natural draft condensers are used widely on household refrigerators and, lately, efforts are being made to employ them on larger capacity compressors because of their efficiency and economy of operation.

To describe how the automatic brazing furnace—two of them are currently in use—fits "hand-inglove" with operations involved in processing the condensers, it might be in order to follow the techniques used by the company in fabricating required components prior automatic brazing.

Three-in-One Operation—Steel used for the condensing fins is cold reduced black plate measuring in thickness about 0.010-inch. It is delivered to the plant in form of large coils weighing about 2500 pounds. When ready for use, the strip coils are transferred to a slitter and cut to the desired width. After slitting, each coil goes through a multistage fin press, the die of which stamps out one fin at each stroke at a high production rate. Type of fin produced may be seen in Fig. 2.

In this operation, the strip is fed from uncoilers directly to the first of the 3-stage dies of the toggle press where the work is done so rapidly that an observer is under the impression the work consists of only one operation. Actually, three jobs are performed here.

In the first die station, perforations are made for holes in each fin, number of which depend upon the length of the fin. The press slits the fin between each alternate pair of holes at the second station. In the third, each tube hole in the fin is flanged and the fin itself is severed from the traveling steel strip. Output of this operation is over two fins per second.

How Condensers Are Assembled—In effect, each condenser consists of a combination of parallel-mounted fins slotted to permit penetration and press fitting of a continuous steel tubing or coil. It is built to user requirements in almost any size and in various fin widths, and in numbers of rows in depth. Thus assembly procedure involves joining stamped fin sections and mounting-brackets to the tubing. This phase of the work is done on so-called "comb" machines which Fedders conceived and patented several years ago to simplify and speed up the assembly of both copper and steel fins.

In preparing fins for the comb operation, they are first arranged in a loading comb manually, then transferred to the machine. Upper platen of the machine, the portion that forms the upper half of the assembly comb, is brought down over the lower half of the comb consisting of the fin assembly. Operator then actuates a control lever to start a hydraulic ram which pushes the serpentine tubing horizontally into the slit fins sandwiched between the two comb platens.

During this operation, the preformed continuous coil "rides" on a pusher. The latter is advanced by the ram in such a manner that the rounded ends of the coil penetrate progressively the slits in the fins from back to front to set up the initial stage of the press-fit operation. Ram is then withdrawn and the assembly combs are compressed together by hydraulic pressure. As the pressure is applied, "fingers" of the comb machine close the slots previously pushed open by the rounded ends of the coils to provide a 360-degree contact between the fins and tubes, completing the press fit. Note Fig. 5.

After the comb operation, the entire unit—bracket, fins and coil—is carried by conveyor into a large automatic straight vapor-type degreaser. From the degreaser, the steel condensers are placed in a row on a conveyor which carries them through a metallizer. Copper wire, taken off reels in continuous operation, is fed into the metallizing guns and, in form

February 7, 1949

of pure molten copper, is sprayed in concentrated jets into each press-fitted joint between the condenser fin and tube, as shown in Fig. 3. Material deposited by the jets supplies the brazing medium for subsequent furnace brazing.

Brazed in 70 to 150 Minutes—From the metallizing station, assembled units are fed into a 100-foot General Electric controlled-atmosphere brazing furnace on power-driven conveyors, Fig. 4. The two 320-kilowatt furnaces currently in use are provided with 3-zone ovens. First zone serves to bring the work up to temperature. Central zone is heated to 2050° F to provide a soaking temperature. The third merely acts as a precooling area. From here the work travels through a cooling chamber a distance of 70 feet to emerge cooled to room temperature. Travel time for the cycles varies from 70 to 150 minutes depending upon the furnace load and method of stacking.

It is during this furnace operation that the chemically pure copper, previously sprayed near the fins and tube joints of the condenser, is carried by capillary attraction under the flange of each of the fin holes to insure maximum bond between tube and fins. The bond is so effective that maximum possible heat transfer is about 25 per cent higher than that obtained with a mechanical bond or when no copper is added.

Several unusual handling wrinkles are employed by the company in processing the condensers through the brazing furnaces. For example, the company found it feasible to braze smaller condensers stacked five and six-high by designing a special stainless steel perforated pallet or tray to support the loads while traveling on the conveyor. The stainless steel trays, incidentally, were found necessary in this phase of the operation for two reasons—they do not sag, and they also prevent the work from brazing to the carrier tray at high temperatures. Most loads going through the furnaces, however, consist of only one condenser per tray, as there are many different types and sizes being brazed at the same time.

Mechanized Flow—Production brazing also is stepped up by a unique method of feeding the condensers into the furnaces. Going toward the furnaces, the work on the conveyor is rolled against a counterweighted baffle plate set between the conveyor's idler rolls. This contact trips an Allen-Bradley limit switch which in turn actuates a solenoid valve controlling an air-operated elevating mechanism in a portion of the feed rolls. The load is lifted, moved at right angles, and projected onto a short section of power rolls which terminates in another air-operated section of the conveyor. This mechanism again moves the load placing it onto the rollers of the roller-hearth furnace.

A photoelectric eye opens the furnace door and holds it open to permit passage of the work. After the load enters the preheating zone, a time delay switch closes the door. Inside the furnace, reducing atmosphere of natural and artificial gas precludes oxidation of the materials being brazed. Oxygen, incidentally, is kept out of the furnace by flame seals at both the entrance and exit ends. The reducing atmosphere produces clean, bright metal outside and

inside the tubes, eliminating scale or other impurities detrimental to refrigeration systems.

Prior to external paint dipping, rubber caps are pressed on the open ends of the condenser tubes. Besides keeping the tube ends free of paint, the caps provide a clean area for making future soldered connections when installing the units in users' equipment. Painting is done on a conveyorized basis. Units are suspended from an overhead chain conveyor and passed through a dipping center where an operator merely removes each condenser from the traveling chain, dips it into the paint, and rehangs it on the same conveyor line which travels on to a baking oven.

Multiple-Row Units—Procedure in assembling multiple-row condensers is nearly the same as that followed in fabricating the single-row units described above. Individual cores are assembled in comb machines, and the required steel brackets with flanged coil slots are stamped out in the press room to include a number of parallel rows of flanged slots equal to the number of cores required for the particular job. The metallized cores are assembled to the brackets with a small press shown in Fig. 1—the flanged coil slots providing an interference fit between condenser coil and brackets to insure a tight braze during furnace processing.

To provide a connection between individual cores of the multiple-row condensers, a crossover or manifold is used, depending upon whether series or parallel flow of refrigerant is required. The crossover is usually a piece of steel tubing, equal in size to the tubing employed for the coil. Ends of the crossover are swaged to permit an interference fit into the coil ends. Brazing medium in this case is a copper ring which is slipped on the joint of the crossover and the coil end. In large units when refrigerant pressure-drop may be excessive if all refrigerant were required to pass through all coils, a parallel coil connection is used. This consists of a steel tubular manifold with a spun end, and extruded holes to receive coil ends.

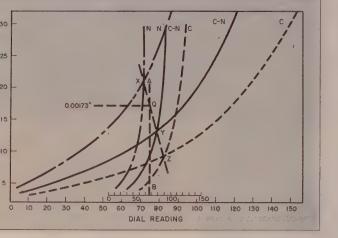
One of the largest condensers built in the Fedders plant was a 3-row unit 30 inches long, 19 tubes high and a fin assembly of six per inch.





THICKNESS OF COPPER-NICKEL C O A T I N G S ... measured by nondestructive magnetic method

CONVENIENT, nondestructive magnetic method for determining the thickness of composite coppernickel coatings electrodeposited on steel was developed recently by the National Bureau of Standards, Washington. The method involves the measurement of the attractive force between the plated specimen and two permanent magnets of different strengths.



Values thus obtained are utilized, in conjunction with a set of previously determined calibration curves for each magnet, to obtain the total thickness of the coating and the relative thicknesses of the copper and nickel layers.

Composite coatings, in which nickel is deposited over a layer of copper, are used extensively in the automotive and other industries for the economical protection of steel against corrosion. While the effectiveness of these coatings is usually somewhat inferior to that of pure nickel plate, the copper required is less expensive than the extra layer of nickel that would otherwise be necessary.

Inasmuch as the absolute maximum protective value of the composite coatings depends largely on their thickness, it is important to have a convenient means for measuring this property. In the usual procedure, the plated article must be destroyed to provide a cross section for microscopic examination.

The new magnetic method, on the other hand, eliminates the necessity of cutting the specimen and is easily and rapidly applied.

This method utilizes the principle of the Magne-Gage, an instrument originally designed at the bureau to measure the thickness of single electro-deposited coatings on the basis of the attraction between a small permanent magnet and the plated sample.

The instrument is essentially a spring balance, on the arm of which a magnet is suspended in contact with the coated surface. A helical spring is so attached that, when wound by means of a knob, it exerts a force tending to detach the magnet from the surface. If, as is ordinarily the case, the coating is less magnetic than the object plated, the required force, as indicated on a dial adjacent to the knob, will be greater for thinner coatings.

Accompanying diagram illustrates a graphic method developed for use with the Magne-Gage in determining thickness of composite copper-nickel coatings. Two previously prepared sets of calibration curves—one set for each of two magnets of different strengths in the instrument—are used. After readings are taken with each magnet on the composite coating under study, one set of calibration curves is superposed on the other. A straight line (XYZ) is drawn joining points of intersection of curves of the same percentage composition for the two different magnets

If a second line AB is now drawn through B perpendicular to the horizontal scales, it will intersect the line XZ in a point Q. The ordinate of Q, read from the vertical scale common to both graphs, is then the thickness of the total coating (here 0.00173-inch). Relative thicknesses of the copper and nickel layers are also obtained by graphical interpolation along the line joining the intersection points of curves of equal composition. In this case, for example, since Q lies along XZ about 40 per cent of the distance from the half-copper curve to the nickel curve, the copper content of the coating is $(40/100) \times .50 = 20$ per cent.

In this way, total thicknesses of composite coatings ranging from 0.0005 to 0.003-inch can be determined within about 10 per cent. The thickness of each component layer of similar coatings can be measured to an accuracy of approximately 15 per cent.

FOR some time a need has been felt by both manufacturers and users of bolts and nuts for an adequate and standardized method of testing—adequate to insure suitable quality, and standardized so that everyone gets comparable and reproducible results. To meet this need the American Institute of Bolt, Nut and Rivet Manufacturers recently developed the series of testing methods quoted herein. A brief discussion of these various procedures may be helpful in interpreting them.

Best evidence of quality of any part, such as a bolt, is how well it functions in service. For this reason testing procedures should be designed to simulate service conditions. In the case of a bolt or nut, this means testing the full-sized product and not just a coupon cut from it. This is particularly necessary in the case of bolts, since the vast majority of them are of sizes that do not lend themselves to coupon tests.

Tension testing of bolts is possibly the most common type of test and is fairly well understood. However, it should be pointed out that full-size testing of the complete bolt is preferable where it can be accomplished. The various details standardized in the test method should also be carefully observed to get reproducible results. Several means were used in the past to convert the total breaking load of the bolt into stress in pounds per square inch. Studies have demonstrated, however, that the so-called mean thread area is the most nearly correct stress area for steel bolts, and the stress obtained by dividing the breaking load of the bolt by this area will most accurately represent the unit tensile strength of the steel in the bolt. This area is that calculated on a diameter equal to the mean of the pitch diameter and the minor diameter of threads of class 3 tolerance. The recommended tension test is as follows:

Tension Test-2. (a)—Tension tests of bolts shall be taken preferably on the finished bolt with the load applied between the head and a nut or suitable fixture, either of which shall have sufficient thread engagement to develop the full strength of the bolt. The nut or fixture shall be assembled on the bolt leaving three complete bolt threads exposed and unengaged between the grips. Nut or fixture shall be assembled freely to the thread runout and then unscrewed three full turns. Fig. 2 illustrates the method for testing a full size specimen. If failure occurs by threads stripping before reaching the mini-

By W. N. BOYD

Chief Inspector

Oliver Iron & Steel Corp.

Pittsburgh

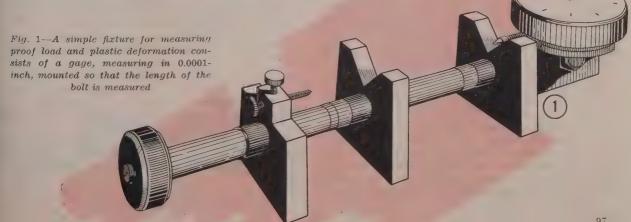
Standard

BOLT and **NUT**

Tests

Aid Both Makers and Users

Long-felt need for adequate, standardized testing methods is met by new series of tension, elastic proof load, yield strength, plastic deformation, hardness, head and stripping test procedures developed by the American Institute of Bolt, Nut and Rivet Manufacturers



mum required tensile load the individual test shall be discarded.

- (b) Where the bolt or thread length is too short for a tension test, acceptance shall be determined by the hardness test described in section 6.
- (c) Tensile strength determination shall be based upon the cross-sectional area of the bolt where the break occurs. The cross-sectional area of the threaded portion used in the determination shall be the mean area as shown in the accompanying table.
- (d) Where equipment of sufficient capacity is not available for testing bolts in full size as described in paragraph (a), tests may be made as follows: Bolts 7_8 to 13_8 -inch in diameter, inclusive, shall have their shanks turned concentric with the axis of the bolt as shown in Fig. 3, leaving the head and the threaded section of the bolt intact. The load shall be applied between a nut or suitable fixture and bolt head. For bolts $1\frac{1}{2}$ -inch in diameter, a standard test specimen shall be turned from the bolt, having an axis midway between the center and the outside surface of the bolt shank as shown in Fig. 5, with a diameter and gage length as shown in Fig. 4.

Realizing that a measure of elastic strength of certain types of bolts is necessary, the elastic proof load test described below was devised. This test is applicable to quenched and tempered bolts. Other types of bolts may not have so definite an elastic limit. This test insures that the bolt will not take permanent set at tension loads up to the specified proof load. A value of 0.0005-inch of apparent permanent set is permitted, but this is intended only to avoid needless controversy over whether a minute permanent set occurred or whether there was a small error in measurement. This value is very useful to the user of bolts in estimating the clamping force that can be maintained by the bolt, since loads on a joint producing higher stress than the elastic limit may result in permanent set and loss of clamping force during service. Values such as yield point, yield strength, etc. often have been used, but they are only approximations of the true elastic properties of the bolt and should be used only in testing bolts too large for the testing facilities and where a machined test coupon must be used.

Elastic Proof Load (Applicable only to Quenched and Tempered Bolts-3. (a)—In determining conformity to specifications for elastic strength, the overall length of a straight sample bolt shall be measured at the true center line; the preferred method of measuring the length shall be between conical centers on the center line of the bolt at the head and point end using mating centers on the measuring anvils; other recognized methods may be used such as ball-point anvils on prepared surfaces at the true center line; sample bolt shall be marked on the shank or head so that it can be placed in the measuring fixture in the same position for all measurements; the measuring instrument shall be capable of measurement to 0.0001-inch; the bolt shall then be loaded as in the tensile strength test to load equal to the specified elastic proof load; the bolt shall then be removed from the testing machine and its overall length be again determined; the length after load-

MEAN THREAD AREA					
Nominal size and threads per inch	Mean thread area (Stress area) Sq. in.	Nominal size and threads per inch	Mean thread area (Stress area) Sq. in.		
½-20	0.0317	7/8-9	0.4612		
1/4 -28	0.0362	7 ₈ -14	0.5088		
∱ ₆ −18	0.0522	1 -8	0.6051		
fs-24	0.0579	1 -12	0.6624		
%-16	0.0773	11/8-7	0.7627		
3 ₈ 24	0.0876	11/4-8	0.7896		
78-14	` 0.1060	1 1/4-12	0.8549		
$\frac{7}{10}$ - 20	0.1185	114-7	0.9684		
½-13	0.1416	114-8	0.9985		
1/2-20	0.1597	11/4-12	1.0721		
%-12	0.1816	1%-6	1.1538		
18 -18	0.2026	1%-8	1.2319		
%-11	0.2256	1%-12	1.3137		
%-18	0.2555	11/4-6	1.4041		
34-10	0.3340	11/2-8	1.4849		
¾-16	0.3724	12/6-12	1.5799		

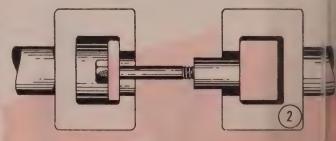
ing shall not exceed that before loading by more than 0.0005-inch.

Yield Strength-4.—Where determination of yield strength is required and the bolt is of sufficient diameter and length to permit use of the standard round tension test specimen with 2-inch gage length of specification E-8 of the American Society for Testing Materials, a test bar shall be turned and tested using extensometer to measure deformation over the gage length. The yield strength shall be the load at which a permanent set in the gage length of 0.2 per cent occurs.

In addition to strength values, the user of bolts wants to know that the bolts are tough and will withstand the required amount of deformation without fracture—that is, that the bolts are not brittle. To determine this property of the bolt a plastic deformation test (see following paragraphs) was devised. This test demonstrates that the bolt will withstand a specified minimum plastic deformation.

Amount of deformation required of a bolt in use is generally very small, and in most cases is only that necessary to permit accommodation of the bearing faces of the bolt head and nut to the faces of the work parts on which they bear-in other words. to compensate for inaccuracy in the production of the fasteners and their mating parts. While it is true that many ductile materials can withstand large amounts of plastic deformation, it is seldom possible to utilize more than a small part of it in service, since a gross amount of deformation would so distort the product that it could not fulfill its function. The test of plastic deformation is most important in high strength materials where the bolt may be brittle if proper care in its production has not been taken. A plastic deformation of 1/32-inch minimum, for example, is recommended for quenched and tempered, high-carbon steel bolts.

Since the deformation occurs principally over the



short length of threads exposed between the testing grips, the deformation is substantially independent of the length and diameter of the bolt. Measurement of percentage elongation and percentage reduction of area of bolts often has been attempted, but with erratic results. Such tests should be used only for large bolts where lack of testing facilities of suitable capacity makes it necessary to use carefully prepared machined test coupons.

Plastic Deformation-5. (a)—Where bolts are tested in full size, plastic deformation shall be determined by the procedure of section 3, except that the test shall be continued until a specified elongation is obtained on removal of the load. The bolt shall not have ruptured during this test.

(b) For bolts not tested in full size (see section 2d) a standard turned test specimen shall be used and elongation in 2-inch gage length and reduction of area shall be determined.

Hardness measurements are possibly the most common tests made. Certainly they are in the producer's plant, where they are widely used for the production control of physical properties. Also in the case of very short bolts, they are the only means of evaluating strength. Routine testing of hardness can be made at almost any convenient location on the product. However, for arbitration purposes, it is well to observe a few precautions as pointed out in the test method quoted as follows:

Hardness Test-6. (a)—Hardness of bolts shall be measured on a tranverse section through the threaded portion of the bolt at a point one-fourth of the nominal diameter from the axis of the bolt. This section shall be taken at one diameter from the end of the bolt.

(b) Hardness of nuts shall be taken on the top or bottom face of the nut. The prongs of castle (castellated) and sloted nuts shall have been removed.

(c) Hardness measurements shall be made pref-

Fig. 2—Tests on full size specimens are made in the rig illustrated here

Fig. 3—Large specimens may be turned down as indicated in order to utilize available testing machines

Fig. 4—Standard round tension test specimens will conform to the dimensions outlined in this illustration

Fig. 5—For bolts 1½-inches in diameter and over, test specimens will be taken from the section of the bolt indicated in the drawing

Minimum Radius Recommended

3 - in, but not less than 1 - In.

Permitted.

2 1 - Parallel Section

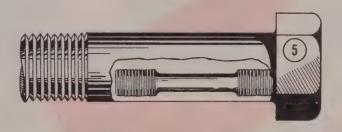
2 2 - 2 0.005" Gage Length for Elongation after Fracture

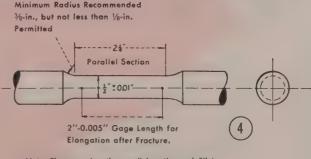
erably by the brinell method. Where sections or hardness range do not permit the use of brinell testing, the rockwell method may be used. Preparation of the sample and method of performing the test shall conform to the standard method of test for brinell hardness of metallic materials (ASTM designation E 10¹) or the standard methods of test for rockwell hardness and rockwell superficial hardness of metallic materials (ASTM designation E18¹). Conversion of values between these systems shall conform to the tentative hardness conversion tables for steel (ASTM designation: E48²). Conversion of hardness and measurements to tensile strength shall conform to the conversion table published by SAE³.

To insure proper upsetting of the bolt head and adequate strength at the juncture between the bolt head and the shank, the head test is used. Various crude procedures have been used, involving hammering and bending of the bolt head without any precision as to the manner of testing. Certainly the bolt head is never subjected to such torture in any condition of service. The head test described here demonstrates that the head-body juncture is the strongest link in the chain and failure must occur some other place.

Head Test-7.—During the tension test specified in section 2 a, failure shall occur in the shank or the threaded section and not at the juncture of the head and shank.

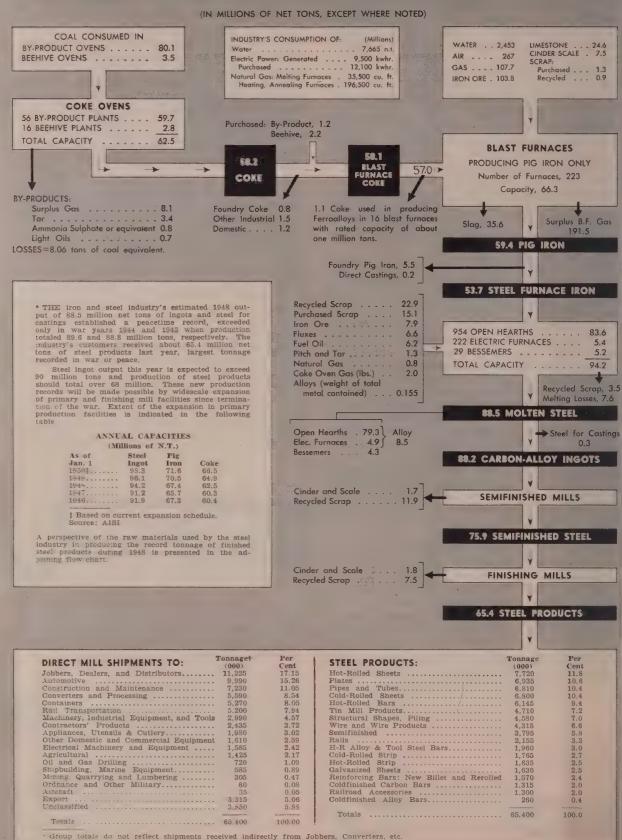
Aside from measurements of hardness, the stripping test described below for nuts is the most usual test and quite nearly represents the condition of use of the nut with a bolt. Here, as in the tension test, the mean thread area (*Please turn to Page 132*)





Note:-The gage length, parallel section and fillets shall be as shown, but the ends may be of any shape to fit the holders of the testing machine in such a way that the load shall be axial.

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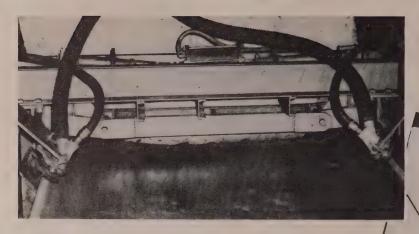


Fig. 1 (left) — Edge cleaning steel plate in pipe fabricating plant

Fig. 2 (below)—Vacu-Blast machine with blast generator (right) and dust filter unit (left)

Dust Eliminated

. . . in vacuum-blast cleaning method

PROBLEM of eliminating the hazard and nuisance of flying dust and abrasive from impact cleaning operations is currently being solved by a dustless blast method developed within the past 3 years by Mead Co., San Francisco and by Vacu-Blast Co., San Mateo, Calif. First used for preparing ship deck surfaces, the units, or Vacu-Blasters, are now employed to clean structural steel beams, vats and tanks, rubber tire and mechanical goods molds, and the edges of steel plate, sheet and pipe ends prior to automatic welding.

Machine consists of two principal units: A blast generator and a dust filter unit. The generator is made up of the direct pressure blast chamber and a reclaimer (or separator) which is directly above the blast chamber. Blast chamber and reclaimer are separated by an electrically-controlled, pneumatically - operated recharging valve. The feed valve, also electrically controlled and pneumatically controlled and pneumatic

matically operated, is mounted below the blast chamber; the blast hose is connected directly to this valve.

In order to realize dustless blast cleaning, it was necessary to have at the blast nozzle some means of retaining the abrasive and the debris resulting from the blast. Many different sizes and types of blast guns, which successfully confine the abrasive and debris at all times, are available with current models to fulfill a variety of requirements. Essentially each gun consists of two chambers, one of which (the inner) channels the blast stream to the surface being cleaned, and an outer chamber which acts as a collection point from which the combined abrasive, dust and scale are conveyed through rubber hose back to the reclaimer.

Complete control of the blast action is afforded by a single 6-volt switch located directly on the blast hose for manually manipulated guns

or at a distant control station in the case of automatic conveyor line installations. This switch operates through 110-volt solenoid valves to control the pneumatic feed and recharging valves mentioned above.

In the reclaimer, all dust and other debris is separated from the abrasive and the latter is deposited in a storage hopper from which it is returned through the recharging valve to the pressure generator for reuse. Dust-laden air which has been freed of usable abrasive in the reclaimer is drawn through rubber hose to the dust filter unit where all dust is filtered out before the air is exhausted to the atmsophere through the positive displacement vacuum pump. No additional dust collecting equipment is necessary even when the unit is used with blast room or cabinet.

Good Joint Tightness Feature of Brazed Tanks

Solidity of one-piece construction is attained through brazing of gasoline tanks and the addition of fittings and brackets of any type at the same time. The tanks, used for gasoline and made in capacities up to 3 gallons, are said to feature good joint tightness under conditions of vibration and impact and high struc-

tural strength, according to Salkover Metal Processing of Illinois Inc., Chicago, the manufacturer.

Materials used are steel with all joints copper brazed in controlled atmosphere furnaces, or aluminum, with all joints furnace brazed with aluminum alloys. Joints are reported to be clean and smooth, without beads. The company states that, if desired, steel tanks may be supplied with corrosion resistant paint. Tanks made are for power lawn mowers,

outboard motors, motorcycles and similar applications.

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Submitted to industry for acceptance is Simplified Practice Recommendation R217-46, copper water tube and copper and brass pipe, prepared by the National Bureau of Standards Washington, D. C. It proposes the addition of three sizes of type N tube and a ¼-inch type L tube.



Dust chutes cause no inter-ference with large pieces.



Guard raises, or swings clear, to expose any part of belt.



Platen in up-position pro-vides flat working surface.



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You speed up flashing, grinding, cleaning, and polishing, with this new Delta Belt Grinding, Polishing, and Debur-ring Machine. You save time, labor, and material.

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a production machine at low initial cost. With accessories to meet your particular requirements, it does hundreds of different jobs.

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Precision Machining Costs Cut

...by use of portable jig boring tool on aircraft parts

PRECISION work on forgings or castings which are assembled on major airplane components is being expedited by a portable jig boring tool developed by Consolidated Vultee Aircraft Corp., San Diego, Calif. Savings of many thousands of dollars are reported to have been realized by using the tool, which will accomplish boring to very close tolerance (plus or minus 0.00025) and can be used for a large number of complex jobs. It is especially adaptable to work on parts which are too large to handle on stationary boring machines, and to fittings already installed on complete major assemblies.

Device comprises a block base hav-

ing a face-normal alignment hole, a precision calibrated disk for feeding the cutting tool, a concentric boring bar with a universal drive joint at its upper end and a cutting tool insert at the lower end, and a balanced feed arm to assure rational cutting and feeding speeds for the device. Various auxiliary attachments are also used. These include a drill end adaptor bar, a step-in ended bar, a boring bar with adjustable tool attachment, a pick-up bar for tooling buttons, and a set-up adaptor plate. The tool can be driven by any conventional electric or pneumatic hand motor

Before development of the unit,



Convair found it necessary to locate and fasten certain workpieces and jigs on the surface table of large standard jig boring machines. In many instances, the work involved expensive disassembly of the part to be worked from its major component. Setting up the jig bore, in itself, required many man-hours and also tied up a machine needed in regular production work. Some jobs were too large to set up on standard machines and had to be shipped to firms with larger tools. Others required large jacks, with the risks of damage involved in handling.

A job on an engine mount tie-in bolt hole which would have taken at least a week was accomplished with the portable tool in 3 hours at Convair's plant. Usual method of reworking a hole which is not in relation to a motor mount hole is to construct a special jig, which requires costly drills, reamers, and spot facers. This particular job was handled by the portable jig bore which was set up on an existing checking plate. The plate was then pinned to two correct motor mount holes, and the simple operation of boring and spot facing completed the job.

Another job on a welding fixture involved the boring of five hole normal to the surfaces and main taining all set positions. This fix ture was too large to place on a jip bore. It would have taken approximately 150 hours to complete the work in the usual way. With the jig bore, the job was finished in less than 6 hours.

Portable jig boring tool is converted to a manual feed by disengagement of a slip ring which is normally employed for rotary engagement with the balanced automatic feed arm disk. Jig bore shown here is set to take very deep cuts in counterboring large landing gear forged fitting

Vitreous Enamel for Aluminum Developed

A vitreous enamel for certain alloys of aluminum, a recent development of E. I. Du Pont de Nemours & Co., Wilmington, Del., is fired on aluminum strips, sheets and castings in furnaces similar to those used to apply porcelain to steel. When so used, the enamel is said to increase

the resistance of aluminum to corrosion, widen its decorative uses and broaden its usefulness, particularly outdoors where it is subject to weather the corrosive effects of the atmosphere.

Enamels have been developed for two alloys of aluminum, 61-S wrought alloy and 43 casting alloy. Two or 3-year exposure of test panels indicate that these enamels will be satisfactory an certain other alloys. The new products contain a high percentage of lead, making them unsatisfactory for coating articles that come in contact with food. Equipment required to apply the enamels to aluminum is said to be substantially the same as that for enameling steel, although firing is at a temperature several hundred degrees lower than that used for steel.

Lundberg Screw Products Co. makes better studs at lower cost with

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Steel costs are reduced 20% to 30% . . . Heat treating of finished studs is eliminated.

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By using J&L Electreat cold-finished bars to replace higher-cost alloys, such as chrome-molybdenum and chrome-nickel-molybdenum, Lundberg not only meets the customer's specifications but also obtains two savings: Steel costs are reduced, and the nuisance and expense of heat treating is eliminated.

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Each bar of J&L Electreat coldfinished steel is individually heat treated at the mill by the electric-induction process under exacting control. The flexibility of heat control in the Electreat process permits "tailormade" combinations of surface and core properties to fit your requirements.

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PRODUCTION OF

OPEN HEARTH STEEL

Difference in results obtained by acid and basic open hearth processes, respectively, is in removal of carbon, silicon and manganese within allowable limits in the acid process, while in basic operation carbon, silicon, manganese, sulphur and phosphorous are removed or reduced

By L. F. REINARTZ

Manager, Middletown-Hamilton Division

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Middletown, O.

PART IV

EARLY history of steelmaking dates back almost 5000 years at which time the Egyptians were able to reduce iron oxide ores into a pasty or spongy mass which could be hammered and forged into crude implements or weapons of war. In this practice handoperated bellows were used which created a weak forced draft, but which was, nevertheless, sufficient to make a hot charcoal fire into which iron ore was added. However, it is believed these early steel men never were able to completely melt iron and only a few pounds could be produced laboriously at a time. This simple process, however, involved two metallurgical principles, in that accelerated combustion or oxidation of fuels was necessary to produce sufficient heat, and that carbon would reduce oxides of iron ores to produce metallic iron.

Later it was found that addition of carbon would make iron hard and strong—but brittle, and absence of carbon would make it soft and ductile—but of low strength. These same principles hold true today, and modern metallurgists know that carbon affects physical properties of steel much more than any other ele-

ment; therefore, today's chemical specifications are written to maintain carbon tolerances of five hundredths of one per cent (0.05 per cent) for this element. As time went on, other elements, such as silicon, manganese, sulphur, nickel, phosphorus, and copper and many others were found to have a very pronounced effect on physical properties of iron. Exact amounts of any of these elements, which were present, were not discerned because methods of making chemical determinations were unknown at that time. Likewise, the reason why these elements altered or changed the physical properties was not known. However, these improvements in physical properties created new uses for iron and established a demand for the product.

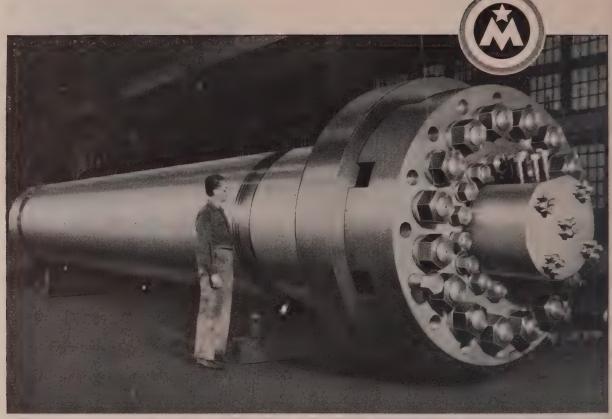
In 1888, as stated previously, the first successful basic open hearth furnace was built and operated in this country by the Homestead Steel Co. at Pittsburgh. Acid open hearths were built at an earlier date but due to the superior quality of steel produced by the basic process, this type of furnace now produces more than 90 per cent of all the open hearth steel made in this country.

Difference in results obtained by acid and basic open hearth processes, respectively is in the removal of carbon, silicon and manganese, within allowable limits in the acid process, while in the basic operation carbon, silicon, manganese, sulphur and phosphorus are removed or reduced. As neither sulphur nor phosphorus is eliminated in the acid furnace, the charge must contain no higher average percentage of these elements than is permissible in the finished product. In fact, due to metal losses in the process,



Fig. 34—Photoelectric colorimeter used to speed up analytical work in the laboratory. Molybdenum, silicon, phosphorus, copper, nickel and chromium can be readily analyzed





The chrome vanadium steel ingot from which this Pressure Vessel was forged weighed approximately 550,000 pounds.

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FORGINGS AND RINGS

CORROSION AND HEAT RESISTING CASTINGS because of the yield from the charge to the ingots being only 90 per cent, sulphur and phosphorus content should be somewhat lower in the charge. Acid open hearth charges generally consist of 50 to 75 per cent scrap and the remainder pig iron, though these proportions may vary. Scrap may be ends of billets, crops, rails, structural sections, etc. Pig iron, suitable for acid practice, contains about $3\frac{1}{2}$ to 4 per cent carbon. Silicon will vary from 1 to 2 per cent. Sulphur must be under 0.050 per cent, and phosphorus must not exceed 0.10 per cent.

In acid open hearth practice, only a few samples ordinarily are necessary. They are cooled and broken. From appearance of the fracture, carbon is estimated. The first sample is taken shortly after melting. By knowing the carbon content, the melter knows how to proceed with his "oreing" operation. After decreasing carbon to a point close to the required carbon content, another sample is taken. When the heat is ready to tap, a third sample is taken. The fracture test on this sample is checked by the chemical laboratory. Temperature of the furnace is tested as in the basic operations.

The great industrial development in this country began when basic steel started to be made in large tonnages. This practice created a great demand for all kinds of steel products. As this development progressed, design of fabricated products became more complex, leading up to our highly developed chemical and metallurgical control of open hearth steelmaking which we have today. A modern open hearth department could not function without a first-class chemical laboratory where samples are quickly and accurately analyzed. (See Figs. 34 and 35)

The basic open hearth process has only one purpose, and that is to refine steel and make a marketable product to satisfy customer requirements. This refining is accomplished in the open hearth furnace through removal of impurities that are present in the scrap and pig iron charge.

When one speaks of the chemistry of the open hearth furnace, it should be divided into three groups: First, the chemistry or analysis of raw materials used to produce a heat; second, the chemistry of reactions which are continually taking place in the furnace during the making of a heat; and third, the chemistry of adding alloying elements.

Raw materials may be classified into three groups which are essential in making a heat of steel. These groups are fuel, a metallic charge (pig iron and scrap) and a fluxing agent, usually limestone or quicklime.

Under the classification of fuel we have the chemistry of combustion as well as analysis of the fuel itself. In order to maintain fuel efficiency and assist in the oxidation part of the open hearth process, sufficient air must be introduced into the flame to maintain a slight excess of oxygen in the atmosphere. Second, complete combustion should take place only over the hearth and in the furnace, itself, which holds the steel to be melted and refined. Faster melting often can be accomplished by introducing extra oxygen, as a gas, through the burner, which makes it possible to burn more fuel, or the same fuel more

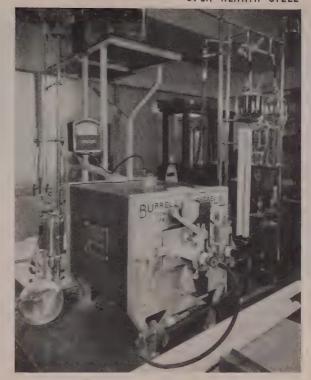


Fig. 35—Furnace for determination of sulphur in steel

efficiently, resulting in more heat and greater production. This practice was the start of an important development during 1947 in the steel industry to help meet the increased steel demand for peacetime production.

The next raw material is the metallic charge which consists of scrap and solid pig iron or hot metal coming direct from a blast furnace. Cold iron from the blast furnace has been known as pig iron for many years. In early blast furnace operations, before the day of the pig casting machine, molten blast furnace iron was cast into many sand depressions on the casting floor. Metal, which solidified in the main trough from the furnace, was known as a "sow", and hundreds of 80 to 100 pound castings extending along each side of the "sow" were known as "pigs" because of a distinct resemblance to those animals. This name has continued to be used universally.

In modern open hearth practice pig iron contains from 4 to $4\frac{1}{2}$ per cent carbon. Silicon, for best practice, when the iron charge is high, should range from 0.80 to 1.30 per cent. If a low percentage of iron is charged, silicon in the iron may easily be increased to 1.50 per cent.

Manganese content will vary from 1.25 to 2.00 per cent. The preferable range would appear to be 1.50 to 1.80 per cent. Manganese content of the pig iron depends largely on the manganese content of the ore. If it is low, basic open hearth slag may be added to the blast furnace charge in limited amounts to help increase manganese in the iron.

Sulphur content of iron is usually specified as being 0.050 per cent or under. For best low carbon



1:50—1st Test — 50 minutes after under cover before any ore addition —some lime up. .Estimated fractures test 0.50 carbon



2:30—2nd Test—40 minutes after the first feed ore—heavy slag—Fracture 0.16 carbon



3:00—3rd Test — 25 minutes after spar—creamy slag—Fracture 0.12 carbon



3:30 — 4th Test — Heat melted—final preliminary test to lab.—Fracture 0.07 carbon



4:00—5th Test—Just fore tap

steel practice in making cold rolled strip steel this sulphur content should not be over 0.035 per cent. Phosphorus content of pig iron varies from 0.125 to 0.300 per cent in the northern part of our country—and up to 0.800 per cent in southern steel plants. When high carbon steel is being made in the open hearth, it is advantageous to use pig iron containing less than 0.200 per cent phosphorus in order to guard against a reversion of phosphorus from slag into the metal during tapping of the metal and slag into the ladle.

Pig iron is usually low in copper and other metalloids, although iron ores from some eastern states contain appreciable percentages of copper, and Cuban iron ores, which are used in steel plants along the Atlantic seaboard, contain considerable chromium. If scrap is charged into the blast furnace in order to increase production of hot metal, copper, chromium and nickel may be present in appreciable quantities.

Scrap analysis must be known in order to charge furnaces intelligently. It should be carefully prepared and segregated according to its alloying elements so that it may be charged to best advantage for recovery of these elements when they are desired in the ingots. For example: Chromium, nickel and copper. Likewise, these same elements may be very undesirable in other grades, and their presence would make the steel unsuitable for its intended use. Therefore, every effort must be made to keep such metals out of these heats.

Representative analyses of scrap are as follows: Plant processed scrap will, of course, be an average of analyses made in the steel plant. If alloy steels are made, care must be exercised in the processing operations to segregate the scrap from such grades of steel.

If a structural steel is being made, the analysis of the plant scrap may be carbon 0.20 to 0.30 per cent, manganese 0.50 to 0.75 per cent, sulphur and phosphorus 0.040 per cent or under and silicon 0.01 to 0.15 per cent.

Rail steel scrap may analyze—carbon 0.60 to 0.80 per cent, silicon 0.15 to 0.20 per cent, manganese 0.75 to 0.90 per cent, sulphur and phosphorus under 0.040 per cent.

The analysis of low carbon sheet or strip scrap will be about 0.02 to 0.10 per cent carbon, 0.20 to 0.35 per cent manganese, silicon 0.01 to 0.20 per cent,

Fig. 36—Left to right—a set of slag samples from start of refining a low carbon steel heat to finish

phosphorus under 0.025 per cent and sulphur under 0.040 per cent and preferably under 0.030 per cent for special purposes. Metalloids, such as copper, chromium, nickel, etc., should be relatively low. Care should be exercised in the sorting of scrap to remove such nonferrous metals as copper, brass, bronze, lead, babbitt, solder, etc. and other deleterious materials, such as rubber, wood, enamel, etc. Arsenic, antimony, zinc, tin and other light metals are very harmful to good steel quality and must be avoided. A bonus is often paid to open hearth stock yard men to help assure good practice in removing all these materials from the scrap.

In most open hearth operations pig iron or molten iron make up the largest part of the metallic charge, and contains most of the impurities which must be oxidized and removed in the furnace. These consist of silicon, manganese, phosphorus, and sulphur. Variation in analyses of these elements should be at a minimum to insure more uniform operation of the refining process.

Chemical changes in refining a charge of steel, which take place in the open hearth furnace, involve a series of reactions and steps which will be taken up in the order in which they occur from start of charge to tapping of the heat of steel.

For practical purposes it will be assumed that as heat of steel is to be made which will be used for making auto bodies or refrigerator panels. In this practice a good quality deep drawing sheet is required. Therefore, steel must be as free as possible from any harmful alloys such as chromium, nickel, molybdenum, tin, arsenic, antimony, etc., and it also must be low in sulphur and copper content. Good quality scrap is selected, and along with some limestone and ore, is prepared to be charged into the open hearth furnace. Limestone is charged first on the hearth bottom, followed by iron ore and scrap. If scrap is light and bulky, the furnace will soon be filled and the operator must wait for 30 or 40 minutes for this original scrap charge to melt down, and then remaining scrap will be charged. This scrap will be melted down for a period of 21/2 to 3 hours. During this time a hot, oxidizing oil or natural gas flame (possibly enriched with oxygen) and preheated air is impinged directly upon the scrap. The mass soon



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becomes white hot and settles down, fuses together, and shortly little streams of molten metal begin to trickle down to the furnace bottom. All through this melt down period, iron oxide or scale (ordinary rust) is forming on the metal. This oxide will later become one of the chief refining agents in the refining period.

After the scrap has melted down to a white-hot fused mass, with puddles of molten metal appearing around the edges and ends of the hearth, the furnace is ready to receive a molten hot metal charge from the mixer or blast furnace. Hot metal and pig iron are the same except that hot metal is poured directly into the furnace at about 2400 to 2500° F after it has been cast into transfer ladles at the blast furnace. This practice insures a great saving in fuel and heat time in that the largest part of the metallic charge is already melted and ready for refining. Amount of hot metal to be charged is generally determined first, by the available supply, and second, on each heat, by the melter, who knows the furnace condition and hot metal analysis. A sufficient amount of hot metal is charged so that the silicon will all be oxidized and the charge, when melted, will contain approximately 0.30 or 0.40 per cent carbon. Any delay in charging of the scrap or hot metal, which prolongs the melt down period, will

Fig. 38—Rimming steel ingots piled on empty ingot buggies showing typical rough ingot top with slight external pipe. Note flat areas caused by being capped with heavy cast iron cap

Fig. 37—Cross section of a rimming steel-split and machined-ingot showing external row of blowholes near surface on lower third of ingot. Secondary row of blowholes about 3 to 4 inches in from the surface and scattered central blowholes. Note very little pipe cavity in top of ingot

create an excess of iron oxide and must be offset by an increase in the hot metal charge to maintain correct carbon balance. Steel quality furnace reactions, and rate of production may be greatly affected if the proper amount of hot metal is not accurately calculated for the charge. The desiliconizing operation in some plants has been explained earlier in this presentation.

When hot metal is poured into the furnace, it not only completes the metallic charge, but vigorous reaction starts immediately creating a boiling action. This is the reaction of iron oxide built up during the melt down and charge ore or sinter with the silicon, manganese, phosphorus and carbon present in the hot metal. These elements are being oxidized and, with exception of carbon, their oxides will rise to the surface and form part of the slag. This is the beginning of the refining operation in the open hearth through oxidation of impurities.

When carbon is oxidized it forms carbon monoxide gas which bubbles up through the liquid steel and escapes into the furnace atmosphere. However, during the early stages of melting, slag—rich in the oxides of manganese and silicon—is rather viscous.





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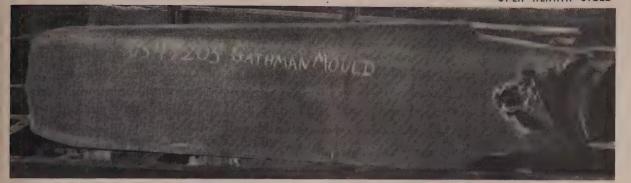
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and this escaping carbon monoxide gas is trapped in tiny bubbles causing a foamy condition and covers the bath with a deep layer of foamy slag which increases slag volume considerably. Since this slag now contains a large amount of the impurities, which should be eliminated from the steel, it is "flushed-off" through a slag notch located in the back furnace wall. This operation requires about 45 minutes. These furnace reactions, just described, are known as the "ore boil," and only heats made on a high hot metal practice with charge ore will react in this manner.

The exact period at which phosphorus is eliminated is difficult to determine, as this is dependent, in a great measure, on the particular practice followed. A low phosphorus content in the charge may be eliminated during the melting period. It is most important to remove phosphorus early in the refining operation. Unlike sulphur elimination, phosphorus can readily be removed in a low carbon steel heat, despite high iron oxide present in the slag.

Soon after termination of the "flush", the heat begins to settle down which indicates that the foamy slag has reverted back to a rather thin, watery slag, and the bath begins to absorb heat rapidly. to this time very little of the limestone, which was charged on the bottom, has floated up to form any slag, because, at this time, unmelted scrap is still covering the limestone on the hearth bottom. However, as the bath becomes hotter, this limestone begins to calcine to form burnt lime or calcium oxide and will rise up to the surface to form a basic slag. This is the beginning of what is known as the "lime boil." This reaction of calcining the raw limestone is accompanied by a rapid evolution of carbon dioxide gas which bubbles up through the metal causing a violent boil. It continues until all the lime is burned and floating in the slag on top of the bath, which at this time is very thick and mucky. Main purpose of slag formation is to flux oxides of impurities in the charge and to protect the metal from direct oxidation by the flame and the furnace atmosphere. Excess amounts of slag will tend to slow up melting due to an insulating effect by the slag blanket on the metal, since all heat from the flame must be transmitted through the slag to melt any remaining scrap in the charge.

The heat is now entering the working period when final adjustments will be made to bring the metal around to a suitable tapping condition. It is dur-

Fig. 39—Cross section of split killed steel ingot which has been etched to bring out central structure. It was poured into a hot topped big end up mold. Notice there are no gas cavities or blowholes as in rimming steel. Pipe or shrinkage cavity is all in the hot top area

ing this period that most of the sulphur, phosphorus and remaining carbon are removed. If the slag is too thick, fluorspar will be added as a thinner and, thereby, will increase the fluxing power to absorb phosphorus into the slag, and speed up sulphur removal.

No element is so irregular in its elimination as sulphur. In many plants it is the practice to allow no higher average percentage of sulphur in the charge than is allowable in the steel ingots. In other plants 20 to 30 per cent of the sulphur may be removed. It is easier to remove sulphur when high carbon steels are being made than when low carbon steels are being melted. Removal of sulphur depends on an excess of lime in the slag, low iron oxide, high temperature, a fast working furnace and a fluid slag.

By the Saniter process, i.e., by use of oxychloride of lime, an exceedingly basic slag must be carried previous to the introduction of the oxychloride. In fact, the slag is so basic that it may contain from 50 to 60 per cent lime. It is claimed this excess basicity with great slag fluidity, due to use of oxychloride of lime, enables the slag to absorb huge quantities of sulphur. This process, however, is not used extensively in the United States.

During the refining period, steel samples will be dipped from the furnace at various intervals to check carbon and sulphur analysis of the metal bath. If too much carbon is present, additional oxygen in the form of iron ore will be added to the bath. This ore should be in lump form, or should be briquetted so it can penetrate the slag and react with the metal. Some scrap may still remain to be melted, so care must be exercised to prevent over-oxidation of the bath as some appreciable amount of carbon is necessary to maintain proper melting conditions. When carbon is present in the steel, evolution of carbon dioxide by reaction of the carbon with iron oxide in the metal is sufficient to cause a bubbling action in both slag and metal, which, in turn, transfers more heat into the steel below the slag covering. If carbon is too low, then the action stops and the slag becomes "dead" and "glassy". At such times

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it reflects heat to the roof instead of absorbing heat from the flame, as it should, in order to increase the temperature of the metal which it covers. These are known as "dead heats" and generally make poor quality steel. At least 45 minutes to 1 hour should elapse between the last ore addition and tapping of the heat. In recent months quite a number of open hearth operators have been reducing carbon, especially in low carbon steels, by bubbling oxygen gas through the metal. The reduction of carbon is very rapid. There is a temperature rise instead of drop as is the case when iron ore is added, in this operation. Furthermore the heat can be tapped soon after the last treatment with oxygen thus speeding up operations considerably.

When the slag is thin enough to pour, a sample is taken to check the lime-silica ratio or basicity and also fluidity. There should be approximately three times as much lime as silica in a tapping slag; however, if visual examination of slag samples shows that the lime ratio is low, then a slag adjustment is made by adding burnt lime. (See Fig. 36) Slag composition and fluidity during the final stage of the heat is very important so that the maximum amount of impurities are removed from the steel and in order to be sure proper metal deoxidation has taken place.

When steel has been sufficiently refined to meet qualifications for the grade being made, a sample of the metal and slag is taken from the furnace by means of a metal spoon and sent to the chemical laboratory for complete analysis. The heat is now ready to tap and as soon as an analysis of steel in the furnace has been received from the chemist, the melter calculates the amount of alloying elements which will have to be added to meet specifications for the grade being made. These are usually added to the ladle during tapping. This refined steel is subsequently teemed into ingot molds where it solidifies. From there it will be taken to soaking pits for reheating, rolled and processed into a finished sheet.

In all these operations it is essential to adhere, as closely as conditons will permit, to standard prac-

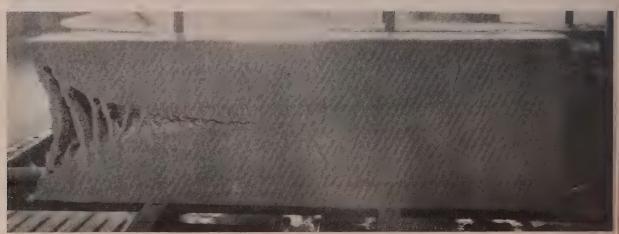
Fig. 40—Split semikilled ingot poured into big end down mold with no hot top. Notice deep central shrinkage (pipe) cavities and complete absence of blowholes

tices in selecting raw materials, charging, refining, and teeming of the steel. The closer an organization can adhere to standard procedures, the higher the average quality of ingots produced in that department will be.

Since there is considerable confusion in the minds of many persons regarding the terms semikilled, killed, rimming, open top, or effervescing steels, a brief description of these types of steel will be discussed.

Rimming, open-top, or effervescing are terms which all refer to the same type of steel. Action in the molds, when such steel is teemed, may be compared to boiling water since the metal bubbles in a vigorous manner immediately after the steel is poured into the mold. Many sparks of incandescent iron oxide are given off by the metal during this period. Degree of action of metal in the mold is controlled by the amount of aluminum added to the ladle at the time of tapping and during the teeming operation. Bubbling action in the mold is essentially caused by carbon monoxide gas escaping from the molten metal as it solidifies due to iron oxide reacting with the carbon in the metal. As the quantity of aluminum added in ladle or mold is increased, bubbling action decreases until the steel reaches the point where there is no longer any bubbling action. The top of such an ingot freezes over very quickly without any reaction, and the steel is then referred to as being "killed". Fully "killed" steels are usually poured into hot-topped big-end up molds to reduce losses caused by excessive shrinkage cavities in the solidified metal as occurs in regular big-end down molds without hot tops. Sufficient aluminum, silicon, titanium or a combination of these deoxidizers have been added to the metal in this instance to combine with all of iron oxide in the metal and thereby prevent any reaction between iron oxide and carbon taking place in the mold. If only enough deoxidizers have been added to the metal in the ladle or mold to barely "kill" the mold action, it is known as "semikilled" steel. Such steel is usually not hot-topped.

Structural differences between rimming and killed steel ingots are shown pictorially in Figs. 37, 38 and 39. Rimming steel ingots after complete solidification



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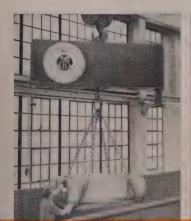
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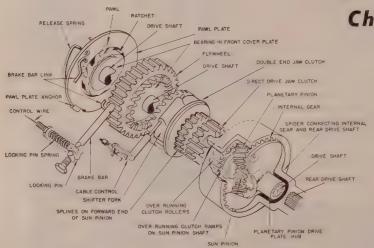
are characterized by a skin or outer shell of solid metal about \(\frac{1}{2} \)-inch thick in the bottom third of the ingot, and a series of horizontal blowholes close together, as shown in Fig. 37, are formed by gas escaping as the metal solidifies. Surface blowholes are deeper seated in the upper two-thirds of the ingot. There are many small blowholes scattered all through the central parts of such ingots. Internal pipe, usually of small volume, is found in the extreme top portion of the ingot. The external top of a rimming steel ingot is characterized by an external cavity due to shrinkage caused by reduction of metal volume. This is due to the rimming or bubbling action which results in the molten metal level at the top of the mold dropping 2 to 3 inches. The top of a rimming steel ingot is usually somewhat rough and uneven due to progressive freezing across the top, and capping of the ingot top with a heavy cast iron cap. (See Fig. 38).

A fully killed steel is characterized by a lack of internal blowholes. In the case of hot-topped steel in which, as explained before, metal is poured into big-end up molds with a refractory brick on top, note Fig. 39, there is an internal pipe cavity in the hot-top portion of the ingot which is caused by shrinkage of the metal as it cools. There is also a small external pipe cavity, at times, caused by molten metal in the hot-top settling down into a portion of the in-

ternal pipe, usually because the ingot top has been covered with an insulating cover of straw, ground glass, refractory or other material. On nonhottopped killed steel, the internal pipe cavity is much greater and goes down deeper into the body of the ingot. (See Fig. 40) Usually such an ingot has two or three internal bridges with a thin thread-like pipe extending down into the ingot as much as one half to two-thirds of its length. This pipe does not cause any trouble as long as it remains clean because it will weld in subsequent rolling operations if the ingot has been properly heated. The top of a killed ingot is characterized by a rather smooth, slightly concaved surface.

Rimming steel in the low carbon ranges (0.08 per cent ladle test or under) is used for many drawing requirements; such as quarter panels, roof panels, inner and outer doors, various refrigerator parts such as doors, aprons, skirts, and a host of zinc coated, or terne coated requirements. Killed steel, or as it is commonly called "stabilized steel," is used where greater ductility is required, or where stretcher strain is such a hazard that rimming steel fails to do the job. Many automobile front fenders represent applications where drawing quality is paramount, while instrument panels illustrate the strain type of hazard.

(To be continued)



AUTOMATIC mechanical overdrive slated for installation on all Chevrolet passenger cars except station wagons and convertibles, is being manufactured by the Truckstell Mfg. Co., Cleveland. The unit is designed for installation on the torque tube, so neither gearbox nor rear axle have to be modified. It operates in all forward speeds; eliminates "free wheeling" in all speeds, and in addition has a "hill-holder" which makes the use of the foot brake unnecessary after the car has been stopped and started on a hill.

Elements of the mechanism are shown in an accompanying "exploded" drawing. They comprise a simple 3-pinion planetary gear "stepup" which reduces engine speed 28 per cent, a sliding double-ended jaw clutch which engages the overdrive control when in forward position or positively locks out the planetary drive when in rearmost position, and the overdrive control mechanism at the front end.

When in direct drive and the overdrive is cut out, the jaw clutch positively ties the internal gear and the

Chevrolet Overdrive

ACTUATED AT ZERO TORQUE

sun pinion together and the entire planetary assembly turns as a unit at engine speed. When overdrive control is set to allow automatic step-up or step-down, the positive clutch is in its forwardmost position. When thus set, an over-running clutch located between the sun pinion shaft and the forward side of the internal gear, transmits the direct drive. This feature distinguishes the overdrive from all other types. It permits going into direct drive from overdrive noiselessly and without shock because the over-running clutch picks up immediately. Conversely, as soon as the ring gear starts to increase its speed (over-drive position) which occurs when the sun pinion is held stationary, the over-running clutch releases at zero toque, again without shock.

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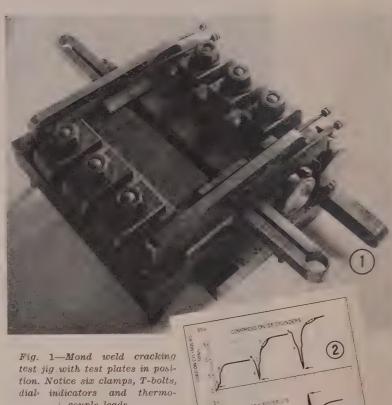
DEVELOPMENT of a quantitative type weld-cracking test which provides more informative results than possible with previous methods employed has been made in Great Britain by Mond Nickel Co. Ltd. Reported in a paper by P. L. J. Leder, Imperial Chemical Industries Ltd., the test, which is of the tied butt weld type, is said to have two new features compared with other tests.

It measures stress across the weld directly, instead of measuring stresses arising out of the thermal expansion and contraction of the test plates. It also takes into account the fact that when a pair of plates is butt welded, a couple at right angles to their plane is superimposed on the main stress, pulling the plates together in their own plane.

In the test, the plates are mounted in a calibrated jig, Fig. 1, which restrains their movement due to welding stresses in two directions, and which, by its own deflection, provides a measure of the forces exerted on it by the welded test plates. The test apparatus has been found to produce satisfactorily reproducible records showing the fluctuations in stress during and after welding, enabling the beginning and course of cracking to be followed closely. Test conditions are reported to be closely controllable and a number of facts, not previously apparent, have been established.

Apparatus records by means of a heavy lever and a dial gage, the result being the amount of bowing caused by the test plates when welded. Vibrations in the lever are reduced to a minimum by a spring caliper. By calibrating the stiffness of the jig in a testing machine this can be interpreted into terms of the couple or bending moment, in inchtons exerted by the test plates on the jig as a result of welding. The calibration is correct only prior to the welding of the test plates.

Force Across Weld Measured-Movement of the plates in their own plane is restrained by two steel cylin-



couple leads

Fig. 2 and Fig. 3 - Typical curves of load on cylinders and jig for austenitic weld

ders placed between them on either side of the V where the weld is to occur. Compression of these cylinders provides a direct measure of the main force across the weld. The cylinders have a compressional yield strength of about 200 tons per square inch. Again by calibration in a testing machine, the compression of the cylinders by the test plates as a result of welding can be converted into load in tons. The actual compression is measured on a dial gage mounted in a spring caliper. During welding, the compression cylinder is kept cool by a water jacket.

Heating of the portion of the jig beneath the weld by radiation is prevented by asbestos packing. The temperature rise in the jig is said to be never more than 15 to 20° C.

When desired, cooling rates are measured by means of a platinum and platinum-rhodium thermocouple flash welded into a 1/8-inch hole drilled in one plate from the root side, and extending to within 3/32inch of the top surface and to within 1/16-inch of the edge of the bevelled edge of the plate. Temperatures are recorded photographically by directing For consistently fine stainless steels, specify

VANCORAM FERRO GIROMIUM Selected to resist nitric acid on the inside surface and atmospheric conditions on the outside, the stainless steel installation shown in the accompanying photograph has a record of over twenty years of satisfactory service.

This is a highly successful use of just one of the more than forty cast and wrought types of stainless steel available for resistance to chemicals, or sea water, or dyes, or foodstuffs, or numerous other environments for which they have already proven highly advantageous.

Regardless of the type, however, quality and precise analysis are primary requisites for success. To insure production of consistently fine stainless steels, Vancoram Brand Ferro Chromium is available, made by closely controlled processing methods and from carefully selected raw materials. The low-carbon grades for the manufacture of stainless steel are supplied with a carbon content from 0.06% max. to 2.00% max., all containing from 67% to 72% chromium.

If you have a technical problem involving the making, treatment, fabrication, properties, or performance of stainless steel, our metallurgical engineers will be glad to help you solve it.



CA

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VANADIUM CORPORATION OF AMERICA

LEXINGTON AVENUE, NEW YORK 17, N. Y. . DETROIT . CHICAGO . CLEVELAND . PITTSBURGH



exposed or contact side.

So solid stainless is not required.

That's where IngAclad Stainless-Clad Steel comes into its own. IngAclad is a 20% cladding of solid stainless bonded to an 80% backing of carbon steel. Thus IngAclad provides 100% stainless protection against rust, corrosion, abrasion and erosion on the contact side.

The advantages are obvious. Lower material cost. Fabricates easily.

Would you like to see how IngAclad can fit into your production picture? Consult our engineers—without obligation. INGERSOLL Steel Division, Borg-Warner Corporation, 310 South Michigan Ave., Chicago 4, Illinois. a spot of light from the galvanometer mirror on to a sensitized paper, the time being recorded by interrupting the spot of light between the mirror and the paper at regular intervals. This is done by a rotating disk with two segments removed.

Form of Curves Obtained—General form of load vs time curves obtained in the tests is shown in Fig. 2 (compression cylinder curves). The load in the first run rises fairly steadily to a maximum, which is maintained (unless cracking occurs) until the start of the next run. At the start of the second run, the load decreases sharply until the run has been completed, when it almost immediately rises again to a new maximum which is again maintained until the next run is put down. The third run causes similar behavior of the load, except that a still higher maximum is reached, and so on. Fall in load which takes place while a run is being deposited is due to the relaxation of stress provided by the thermal expansion.

Besides the general form, the curves show a number of arrests. The first run always shows one fairly well-defined arrest and sometimes a second, usually less well defined. Each subsequent run shows an arrest corresponding to the first, on the first run in the raising curve after completion of the run and sometimes evidence of a second. Arrests probably are due to relaxation afforded by the martensite transformation. Where it is necessary to use a second electrode, the brief interval (for changing) causes a halt in the fall of the load until the restarting of welding when the load decreases again Letters A, B, C, D, E and F designate arrests, E and F being arrests due to changing electrodes. Arrests C and D correspond to arrests A and B in the first run. They can also be seen in the third run.

Fig. 3 shows the load curves for the bowing of the jig. in the first run the bending moment, after an initial rise to a small "positive" value, changes rapidly to a substantially constant negative value, maintained until the start of the second run. In the second run, the negative bending moment falls off sharply and usually reaches a small positive value before again rising to another negative value, somewhat less than that reached in the first run. When this value is reached a third but less sharp reversal of stress takes place, it also generally reaching a positive value.

Bending Almost Positive-Third run causes similar reversals of stress except that the bending, moments are now almost entirely positive. In

go

much

farther



READY-POWER



Ready-Power-Equipped Mercury Fork



Ready-Power-Equipped Clark

BEST because Ready-Power delivers "constant-peak" electric power generated right on the chassis by the Ready-Power gaselectric Unit.

BEST because Ready-Power Units are available to fit the specifications of any electric truck manufacturer and can be installed at your request.

BEST because *only* Ready-Power can give you the constant availability of gasoline PLUS the flexibility and low maintenance of electric drive,

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3824 Grand River Ave., Detroit 8, Michigan

subsequent runs the curves keep the same appearance, although increasingly displaces in the positive direction.

Beginning of cracking, when it occurs, is indicated by a falling off in the bending moment on the jig. This may occur some time before the crack becomes visible. It is stated that calculations of the maximum transverse stress across the weld must be considered with reserve, because of the necessity of making two assumptions: That the stress distributions along the length of the weld and through its thickness are linear.

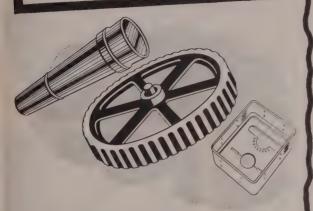
Work Carried Out—According to the paper, the work carried out using this cracking test has all been in connection with the welding of high tensile alloy steels (75 to 110 tons range) using both austenitic and ferritic electrodes. The majority of the tests have been directed at establishing the relationships between welding conditions (including electrode materials), stresses developed and resulting cracking behavior.

When using austenitic electrodes, it was found that, contrary to expectations, the welds that cracked were not subjected to higher stress levels than those which did not crack. There was, in fact, a tendency for the stresses in the cracked welds, prior to cracking, to be lower than those reached in the uncracked welds. This indicated that cracking behavior was probably a function more of the properties of the heat affected zone than of the stress level reached.

In tests using two ferritic electrodes the welds fractured at stress levels one-third to one-half of those reached in austenitic welds, thus showing not only that stress level was not the primary cause of weld cracking, but also that the stress level reached in a weld is not dependent to any important extent upon the properties of the weld metal. The conclusion is advanced that under conditions of joint geometry and external restraint, the transverse stress in a weld is principally determined by the volume of weld metal deposited, its thermal expansion characteristics and the heat input.

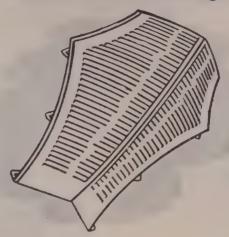
Load vs time curve obtained with a ferritic electrode shows that, until the fracture occurred, the curve was following a course similar to that of an uncracked austentite weld with similar stress levels. All of the evidence suggests that, with a given set of conditions of size of weld, temperature and thermal expansion characteristics of deposited metal, etc., there is a more or less constant load-time curve for that weld, whatever weld metal or parent material is used, and that the performance of materials

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IN ONE OPERATION, often in less than one minute, this economical cleaning method removes all traces of grease and oil from metal parts of any size or shape—plastics, glass and many other materials. It can save time and cut costs in large and small plants because it speeds production and cleaning.

reaches almost inaccessible places . . . reduces risk of damage



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"METAL DEGREASING—STANDARD PRACTICES" tells you how to carry out Vapor Degreasing safely and economically. It shows why the results obtained with this method can't be matched. It shows typical compact, scientific equipment, which is available for efficient and economical operation. And it gives information about solvents used in this equipment—Du Pont Trichlorethylene and Perchlorethylene—which under various trade marks have been widely used for many years. Send for it today!

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Please send me my copy of "Metal Degreasing—Standard Practices."

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You will find it a practical and profitable advantage to secure your Cold Finished Bar requirements from Bliss & Laughlin, Inc.

You get more than good steel. You also receive friendly and cooperative service and counsel to help insure the best results in fabricating that steel into finished parts.

Our technical field men will gladly enter the picture at the blueprint stage . . . to work with your plant men in selecting the proper steel grades . . . in determining heat treating procedures . . . and in working out special machining problems.

In the competitive days ahead, you will appreciate the efforts of B & L engineers to help you improve your product and reduce costs.

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under test can be measured by the point on this curve at which fracture occurs.

In the case of the ferritic weld, failure occurs at a point on the curve leading up to this level. Improved resistance to cracking, as a result of post heating is not due to stress relief and must, therefore, be due to an improvement in the mechanical properties of the heat affected material.

With regard to the effect of energy input, tests confirmed that an increased heat input causes a slower cooling rate after welding, although, as was subsequently found, this decrease in cooling rate is small compared with that caused by a relatively small amount of post heating with a small oxyacetylene flame. The tests on variations in technique showed that these had no pronounced effect on the cracking behavior.

From The Iron and Coal Trades Review.

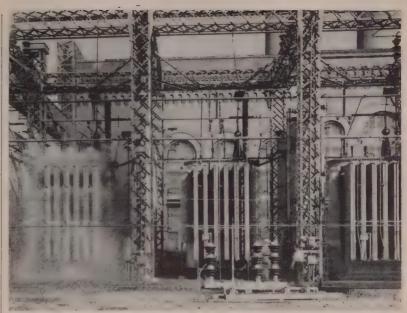
Snow Loaders Feature 8 To 20 Yard Capacities

Spiral feed with renewable steel teeth which pick before they shovel is a feature of the two snow loaders, made to handle from 8 to 20 cubic yards per minute. The machines, a utility and a heavy duty model, are made by N. P. Nelson Iron Works Inc., Clifton, N. J. The former, model KR-5, will handle light materials other than snow without a change. It is convertible for heavier materials such as gravel and broken stone with a bucket boom available separately.

Model M-10 heavy duty machine is ruggedly built to handle the heaviest kind of snow removal, the company states. Like the smaller model, it is convertible for year-round use in other operations. It is offered as wheel or crawler mounted and like the utility model is self-propelled. Power is furnished by 27 and 40 horsepower LeRoi engines, respectively.

--0-

A recently developed pressed steel radiator unit, electrically heated through the medium of hermetically sealed oil, is thermostatically controlled and can be used to supplement present heating systems as well as to supply temporary heat. Developed by Acrow Inc., Newark, N. J., the Hurseal unit, as it is known, is filled with a special grade low expansion oil. An electrical element, welded into the radiator or panel wall type pressed steel unit, heats the oil quickly to a low surface temperature of 160° F. Radiating surface is 20.15 square feet per kilowatt.



Southern utility company's 15,000 KVA transformers under "Automatic" FIRE-FOG blanket of protection

Detect FIRE Fast! Extinguish FIRE Instantly! WITH "Automatic" FIRE-FOG

IT'S ELECTRICALLY SAFE AND FIRE SAFE

You don't have to be an economist to recognize the serious financial losses involved in fire incurred power failures in transformers and associated electrical equipment. They're losses that go far beyond the destruction visible to the human eye. Industrial out-of-service time for example, often far exceeds actual property damage, yet seldom is it evidenced in fire reports.... They're unnecessary losses too, for modern "latomatic FIRE-FOG is now available for the protection of many types of electrical equipment. Detection of fire is auto-

matic...FIRE-FOG operation instantaneous. From strategically located nozzles, a barrage of fine water spray is directed at the heart of the blaze. Flames are beaten down... the fire area cooled, and seconds later, extinguishment is complete with damage confined only to the point of fire origin. Power service may be readily restored and latomatic FIRE-FOG although composed of water, is electrically safe and carries the approval of all leading insurance authorities.

Industry's unremitting demands have past proved the safe, dependable and economical protection provided by *Automatic* FIRE-FOG. What it can do for you can best be told by one of our representatives who will gladly assist in your fire protection planning and furnish surveys and estimates without cost or obligation.

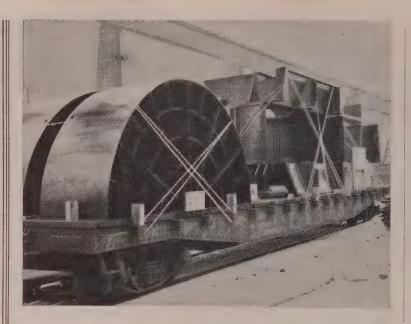
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"A famous member of the "Uniformatic "Eprunklet" Family ... provides basic fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, dryers, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.



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• This carload of pre-heating equipment was quickly, firmly and safely secured with Gerrard Round Steel Strapping. Gerrard Strapping is convenient to use. Every Gerrard machine tensions the strapping, forms its own twisted seal, trimmed smooth with no exposed ends. The binding operation is simple and rapid, saves valuable time.

Gerrard Steel Strapping helps you cut costs, too. In many cases its use has reduced material costs 30 to 50 percent.

And the Gerrard method gives unrivaled protection. Packages are securely bound into rigid, pilfer-proof bundles. In crates, cartons, palletized loads and carload lots of steel pipe, sheets and machinery, torsional sway is practically eliminated and damage claims are sharply reduced.

The services of Gerrard engineers are available without charge to help you solve your packaging problems. Write for free copies of Blue Book of Packaging and Red Book of Carload Stowage.



GERRARD STEEL STRAPPING COMPANY

(Formerly The Gerrard Company, Inc.)

4745 So. Richmond St., Chicago

UNITED STATES STEEL

Induction Hardening

(Continued from Page 91)

ing uniform for all teeth, little warpage occurs. No straightening is required, as the gear is again heated (in other equipment) before being shrunk onto the rim of the flywheel that it is made to fit. Core of teeth and the ring itself remain soft but higher surface hardnesses are obtained at the clashing and wearing surfaces than can be obtained by the conventional method of heat-treating gears. The result is longer service life.

After quenching, the gear is again elevated to the position in which it was loaded and is removed and replaced by another. While the cycle just described proceeds at one station, the operator unloads a gear at the other station and puts a new one in its place. Through this alternate arrangement, one generator serves both stations, one at a time, and a single operator handles a total of 180 gears an hour or 90 per station.

One station of this same machine is used alone when production requirements do not demand duplicate fixtures. This is the case on a steering bellcrank shaft of SAE C1041 steel that has two bearing areas, spaced apart, to be hardened. In this case, there are two coils in series placed coaxially and the shaft is set centrally inside these coils and supported on centers for rotation during heating and quenching. Both the coils and the ring from which quench water is applied, are spaced, of course, so that the areas to be hardened are heated and quenched uniformly. This shaft is processed at the rate of 106 per hour, using only one station.

Hardening of knuckle pin surfaces is done in the latest setup using another two-station Reeve electronic machine. Two journals are surface hardened after heating in two coils appropriately placed, one above the other. The holding fixture is elevated automatically to loading position, the pin being set between centers. When a button is pressed after loading, the pin is lowered automatically and starts to rotate slowly inside the coils, which are then energized.

It requires about six revolutions for the surfaces to attain quenching temperature. Thereupon, the current is shut off and radial quenching jets of water from an outer sleeve are turned on automatically. At the end of the quench period, rotation stops and the work is raised automatically for unloading and reloading.

In this machine, the two stations

INDIVIDUAL SOLUTIONS



SPECIFIC PROBLEMS

If your requirements can be satisfied only by new concepts or special adaptations of more or less standard products, let us co-operate. Today, all Electro Products are the

result of specialized research and development: and most of our activities are routed from job-side studies by our Field Engineers to our Engineering or Chemical Laboratories, then back to job-side application by these same Field Engineers.



"Field Engineers" is not a loose term with us to falsely glorify specialty salesmen. Every one of these men came to us from a technical institution; was then given ad-

ditional training in Electro's Laboratories and Departments; and finally assigned to cooperative work in various industries before promotion to Field Engineer. These are the bases of their competence to work with you in the solution of your Specific Problems.

Electro SERVES THESE INDUSTRIES.

METAL—Non-Ferrous and Ferrous Foundries: Steel Mills and Smelters: Brass Rolling Mills: Heat Treaters and Annealers.

CERAMIC—Potteries: Art Potteries: Manufacturers of Grinding Wheels: Sanitary Ware: Floor and Wall Tile: Electrical Porcelain; Miscellaneous Ceramic and Enamel Piants.

AUTOMOTIVE—Foundry, foundry cleaning, abrasive cutting-off, heat treating, tool room and precision grinding and finishing departments.

CHEMICAL—For applications where high temperatures or other severe operating conditions indicate the use of special refractories and cements.

SHIPBUILDING—Weld grinding, abrasive cuttingoff, tool room and precision grinding, foundry, foundry cleaning, heat treating, power plant refractories.

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ABRASIVE WHEELS -Resin-bonded, High-Speed Grinding Wheels to cover nearly every conceivable use from snagging and cutting-off operations to fine precision grinding.

CRUCIBLES — (Tercod-Conqueror) Pedestal Blocks and Pot Lids—
The Carbon-bonded Crucible for melting aluminum—nickel—copper
—the brasses and branzes—zinc—silver—gold—iron, using any fuels
oil, gas, coke or coal, electricity.

REFRACTORIES —Special Refractories—Electric furnace refrac-

REFRACTORIES —Special Refractories — Electric furnace refractories of all kinds used for:
CERAMIC KIIN FURNITURE — Slabs and Posts for rigid, floating or
Semi-floating open construction; plate setters, tile setters, sanitary
ware setters and silicon carbide saggers.
MUFFLES AND HEARTHS —One piece and sectional for enameling
furnaces, tunnel kins, assay and heat treating furnaces, pottery kins.
CRUCIBLE FURNACE FURNITURE—Linings, covers, insulation, burner
Kinstein

blocks.
PYROMETER TUBES—And tubes for other purposes.
BRICK—9" series or special shapes to individual specifications.
BURNER BLOCKS—Electric furnace door blocks, door frames, port

BURNER BLOCKS—Electric turnace abor blocks, abor frames, port-blocks and electrode sleeves. STOPPER HEADS—For steel ladles; also slag hole and tap hole

CEMENTS —Cements and Ramming Compositions—Of special re-fractories used by all industries; monolithic linings for electric, gas and oil furnaces; patching furnace walls, laying brick, boiler setting

ALLOYS —Special compositions for additions, deoxidation, de-gasification, purification: Copper — Aluminum— Chromium — Titanium — Nickel — Silicon — Iron Magnesium — Lithium — Calcium — Calcium

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Electro Refractories & Alloys Corporation

344 DELAWARE AVE.

West Coast Warehouse LOS ANGELES

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VACUUM

SPEEDS CHUCKING ...

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GAST ROTARY PUMPS

HOW TO HOLD ODD-SHAPED PIECES IN SPEED LATHE

Problem: Find a way to cut chucking time — and boost productive capacity — on a high-speed lathe used for polishing odd-shaped pieces.

Solution: A Gast Rotary Vacuum Pump (Model 20FF60) supplies vacuum for positive chucking through hollow spindle with rotary joint. Using a 1 h.p. direct-drive motor, pump rating is 17 c.f.m.—vacuum up to 27 inches.

Result: Chucking and set-up time is cut
— productive time is increased. Thus, through
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another manufacturer improves his product with Gast Rotary Vacuum Pumps as components.

Lathe Manufacturer's name on request.

Perhaps you'll never face a problem just like this...yet Gast Rotary Units may solve other problems you'll have tomorrow!

Over 200 different variations of basic Gast units now serve as original equipment on scores of products. In totally unrelated fields — from automotive repair to chemical processing — Gast Rotary Air Motors, Vacuum Pumps and Compressors are helping improve performance, increase safety, and lower costs.

As an executive concerned with product design and improvement, you'll want to know more about Gast Rotary Units. If you have a specific problem, write us the details. We'll gladly cooperate with engineering help. Ask for your copy of our Idea-Catalog, too.

Remember ---

"Air may be your Answer."



WRITE TODAY!
Request your copy of Gast's
IDEA-CATALOG



(TO ONE H.P.) (TO 30 LBS.) (TO 28 INCHES)

GAST MANUFACTURING CORP., 133 Hinkley St., Benton Harbor, Mich.

are used alternately, one being unloaded and reloaded while the other is going through the automatic cycle just described. Output is about 200 pins per hour, half from each station, only one operator being required. Included in this machine is a heat exchanger that automatically controls the temperature of water circulated through heating units. This water is distilled and remains within the circulating system.

Induction heating is not only rapid but yields uniform results because of precise automatic controls. So little heat is radiated that surroundings are not warmed significantly. Induction machines are set up adjacent to the machine tools that produce the parts and thus facilitate handling. Very little maintenance work is required. All of these factors contribute to overall satisfaction and economy.

Booklet Covers Advances In Printed Circuits

Mass production of electronic devices is now utilizing printed circuits as a practical technique, they having emerged from the experimental stage. Realizing this, the Aeronautical Board's Aircraft Radio and Electronics Committee under the supervision of the National Bureau of Standards held a technical symposium last year at which 22 invited papers were presented on the status, applications and limitations of printed circuits.

Containing 18 chapters, 73 pages, 43 illustrations and 6 tables is a booklet covering the symposium, available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Known as NBS miscellaneous publication M 192, it has chapters on such subjects as conductive silver preparations, printed resistors, vitreous enamel dielectric products, printed electronic components on glass, plastics and other nonconductors and typical commercial applications.

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Chemical Safety Data Sheet SD-25, Hydrofluoric Acid, is the twenty-fifth in a series of chemical product safety manuals published by Manufacturing Chemists Association Inc., Washington, D. C. Written for supervisory staffs and managements, the manual sets forth the important physical and chemical properties of the acid, the usual shipping containers used for it, the methods for unloading and emptying the containers, etc. Copies are available at 20 cents each.

What's so glamorous about advertising?

THERE IS A curious belief in some quarters that advertising lives in a glamorous and almost occult world of its own, quite insulated against the cold science of the production line.

That, of course, is pure Hollywood.

Advertising today (in the business press, at least) is about as glamorous as a drop forge, and twice as efficient. It can become just as important to your profit-and-loss picture as plant maintenance, safety engineering, production techniques or cost-accounting. Maybe even a little more so.

Because the biggest plant capacity, and the best production know-how, can't create a single dollar of profit—not until something is sold. And selling, in our economy, is a mass production job!

Advertising simply provides the necessary machinery. It is the application of assembly line methods to the

manufacture of a sale. For sales don't just "happen." Like any other commodity, they require a series of processing operations. Usually, it takes five:

- 1. Seeking out prospects
- 2. Arousing their interest
- 3. Creating a preference for your product
- 4. Making a specific proposal
- 5. Closing the order

By mechanizing the first three of these operations, advertising enables your salesmen to concentrate on the two jobs which they alone can do, and do best. And nowhere does the machinery of advertising work more efficiently than in the business press, where it reaches the greatest number of interested prospects, at the lowest possible cost.

Maybe – to the man who appreciates machinery – advertising is a pretty glamorous business, at that!



/TEEL

is a member of The Associated Business Papers, who have just published a book entitled, "Copy that Clicks — with readers." Next time you see your advertising manager, ask him to show it to you. And if you'd like a copy of your own, we'll be glad to mail you one.





This cast iron valve plate for a refrigeration unit is finished on double surface Microflat Machine to 8-microinch r.m.s. finish—optically flat and both sides parallel within 0.0001-inch. Production rate is 20 pieces per minute.

FINISH flat surfaces, on any material from soft copper to quartz or nitralloy, regardless of the shape or size of the part, in high production. Opposite sides of one or many parts are finished simultaneously on double surface machines,—productively produced to one light band of flatness and within one microinch r.m.s. surface finish. Recessed surfaces may also be finished on single surface machines.

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Micromold Manufacturing Div.
Boston Post Road
Guilford, Conn.

Nut and Bolt Tests

(Concluded from Page 99)
may be used to convert the stripping load of the nut into stress

may be used to convert the stripping load of the nut into stress in the bolt in pounds per square inch. The mistake should not be made, however, of inferring that the stresses thus calculated have any relationship to the tensile strength of the nut. The nut generally is over-designed in its thickness to the point where nut material of possibly 60,000 pounds per square inch tensile strength can develop a load which will represent a stress in the bolt of some 90,000 pounds per square inch.

Stripping Test-8. (a)—The sample nut shall be assembled on a hardened, threaded mandrel and the specified test load applied to the nut. Threads of the nut shall not strip at this load. If the threads of the mandrel are damaged during the test, the individual test shall be discarded.

(b) Mandrel shall be threaded to the American Standard class 3 tolerance except that the major diameter shall be the minimum major diameter with a plus tolerance of 0.002-inch.

(c) If the unit tensile stress developed in the mandrel is required, the loads thus obtained shall be divided by the mean thread area as given in the accompanying table.

Many other tests have been applied to bolts and nuts such as bending bolts, flattening nuts etc., none of which bear any relation to the loading of these products in use. Generally such tests are a waste of effort as they determine nothing of any real value to the use of the bolt. It is believed that the tests detailed in the recommended test method are sufficient to demonstrate the serviceability of the product for most purposes. Also, the methods are carefully written to avoid disagreement between producer and user over minor differences in results due to differing methods of testing.

REFERENCES

1. 1946 Book of ASTM Standards, Parts I-A

1-B
 1946 Book of ASTM Standards, Part 1-A
 SAE Handbook, 1947 Ed., Society of Automotive Engineers Inc., 29 W. 39th St., New York pp. 374-478

Copy of the complete "Standard Methods of Mechanical Testing of Bolts and Nuts", consolidating the above quoted paragraphs, may be obtained on application to the American Institute of Bolt, Nut and Rivet Manufacturers, 1550 Hanna Building, Cleveland 15.

Management and labor problems and experience under the Taft-Hartley Act and new patterns of employee relations in the United States and abroad are presented in three pamphlets published by the American Management Association, New York.

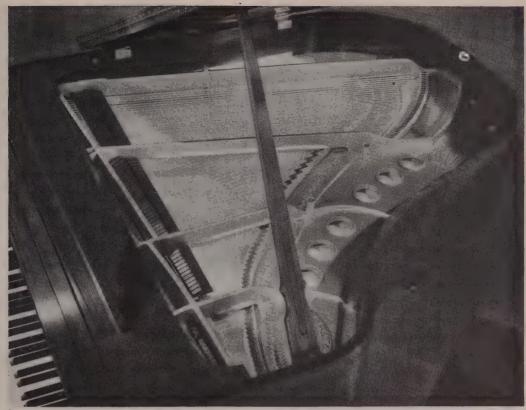


Photo of the Steinway by Victor Keppler

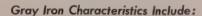
What Does a Piano Plate Need?

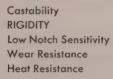
The purpose of a piano is to make music. To achieve that purpose successfully, it must be true to tone . . . it must hold pitch. The pull of the strings in a concert grand piano may be as great as 20 tons. In the plate which holds the strings, therefore, rigidity is essential.

Rigidity is one of the outstanding characteristics of Gray Iron. It also has a low coefficient of thermal expansion. That is

why fine pianos are built with plates of Gray Iron. This quality of rigidity, combined with its many other attributes, makes gray iron the best material for thousands of products, from huge machine tools to delicate instrument parts.

Write for free booklet, "GRAY IRON— Its Mechanical and Engineering Characteristics, and Details for Designing Cast Components".





Corrosion Resistance Machinability Vibration Absorption Durability Wide Strength Range

Make It Better With Gray Iron



GRAY IRON FOUNDERS SOCIETY INC



THIS IS THE BACKGROUND FOR BETTER FORGINGS IN 1949

The great scarcity in today's market of many raw materials and products, makes it most essential that everything be made of the best. We should not take chances by using inferior materials. This speaks for steel forgings particularly, because one of the critically scarce materials today is steel. We must conserve it, and one way to do that is to use forgings which will stand up and give continued service under the stress and strain of constant daily use.

In the plant pictured above the National Forge and Ordnance Company makes better forgings. Backed by years of experience, with equipment that is up to date in every respect, a skilled personnel turns out a product which has taken a well deserved place in the productive activity of this country.

The product is thoroughly controlled from start to finish. The steel used is made in Basic Electric Melting Furnaces located under the long ventilating louvre at the right of the picture. From that point it is forged, heat treated, and machined as it passes through the shop toward the left.

A better product can only be produced when it is made by men who possess the proper knowhow and its production is supervised to assure that it receives every deserved attention. This is true of any product, and it is especially true of a steel forging.

The importance of the steel forgings you use, therefore, makes it advisable that you know, in detail, how well National Forge can serve you in the year ahead. The better your forgings, the better your product.

NATIONAL FORGE & ORDNANCE COMPANY, IRVINE, WARREN COUNTY, PA.

Gas Turbine Bearings Present Lube Problems

Problems that lubrication theories cannot explain satisfactorily are still faced by engineers designing journal bearings, particularly those for gas turbines and high speed supercharger drives. This fact was brought out by Arvid E. Roach of General Motors Research Laboratories, speaking before a recent meeting of the American Society of Mechanical Engineers in New York. His paper was contributed by the society's special research committee on lubrication and petroleum.

He pointed out that theoretical studies imply that the rate of convergence of flat parallel plates separated by an oil film is such that infinite time is required to obtain contact between perfectly smooth surfaces. This implies that the load-carrying capacity of a bearing should be infinite. Real bearings, however carefully fabricated, do not have infinite load-carrying capacity. He went on to say that the actual loadcarrying capacity of a real bearing is a question that not yet has been satisfactorily answered.

Under certain conditions of bearing operation, as in gas turbines and high speed supercharger drives, Mr. Roach stated that the load-carrying capacity may be substantially zero. There is as yet no single criterion for load-carrying capacity which satisfactorily fulfills the practical needs of the engineering profession. Engineers still have no satisfactory method of measuring or computing the variation of lubricant viscosity within the load-supporting oil film. Likewise, they have no true method of measuring or computing the actual temperature changes within the oil film that lubricates the bearing, he

Revised Band Saw Process Approved

Commodity Standards Division of National Bureau of Standards has stated that the revision of the simplified practice recommendation for metal cutting band saws has been approved for promulgation. Bearing the serial number and title R214-48, Metal-Cutting Band Saws (Hard Edge, Flexible Back), it went into effect Dec. 15, 1948.

Recommendation consists of a simplified list of stock types and sizes. Width, thickness and number of teeth per inch are listed for two types of saws-regular and skip-tooth. It in-

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FOR CONNECTING ROD BEARINGS

FOR SPLIT BEARINGS





FOR RING AND PINION MESHING

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- 1. No precision machining, grinding, filing, miking.
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- 4. No dirt, oil, grease between shim layers.
- Harder than stacked or ordinary one-piece shims.
- 6. Your customer recognizes LAMINUM shims as a plus in maintenance.

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Let us quote on your difficult stamping jobs. Our experience, tools and presses are geared for close tolerance production.

* LAMINUM (Reg. U. S. Pat. Off.) shims are solidly bonded laminations of .002 or .003 inch precision gauge brass or steel wi'h a microscopic layer of metallic binder. Cut to your exact specifications.



LAMINATED SHIM COMPANY, Inc. 3402 Union Street Glenbrook, Conn.



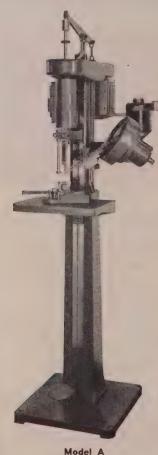
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AN-COR-LOX NUTS



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Model A

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and it's got a big appetite when you drive screws the old way, by hand . . . Just stop and think how much money you throw away annually through marred heads and stripped threads. You'll no doubt would find it's plen-Stop the leak NOW. Use DETROIT POWER SCREWDRIVERS, the outstanding machines that do a perfect job without damage to heads or threads . . . and they drive screws at a tremendous speed, as fast as one a second. Consider too what this time-saving means. That alone will make a DETROIT POWER SCREWDRIVER pay for itself. These hopperfed machines will drive standard machine screws, sheet metal screws, self - tapping screws with standard, round, binder, fillister or hex heads and special heads. DETROIT POWER SCREWDRIVERS are furnished in 3 models, one to fit your requirements.

Send sample assembly for estimate

2811 W. Fort Street DETROIT 16, MICHIGAN cludes size tolerances and general provisions covering type of tooth set, shape of teeth, width of set and hardness.

Work Simplification Round Table to be Held

Fifth of a series of management round tables on work simplification is to be held under the auspices of New York University College of Engineering on 10 consecutive Mondays beginning March 21. The sessions will cover not only industrial work but also administrative and clerical activities.

First of the two groups into which the enrollment will be divided will devote attention to administrative and clerical problems involving work distribution, office layout, paper work, machine accounting, workplace arrangements, etc. The second group will study industrial work including investigation of the product, flow of materials, plant layout, operational analysis, and machine utilization. Enrollment in each group will be limited to 15 individuals whose present responsibilities permit them to initiate work simplification programs in their own organizations.

Surface Treatment of Magnesium Discussed

Paint protection, stress analysis and design considerations, and corrosion of magnesium were discussed at a meeting sponsored by the Magnesium Association and Mellon Institute, Attended by about 85 members and guests, the meeting was held at Mellon Institute, Pittsburgh, recently with co-chairman E. S. Christiansen, Magnesium Co. of America, Chicago, and Dr. L. A. Carapella, Mellon Institute, presiding. Dr. R. W. Tillotson, Mellon Institute, welcomed the visitors, and Dr. Carapella presented a brief review of some of the work being conducted at the institute.

In discussing paint protection of magnesium and its alloys, Robert I. Wray, Aluminum Co. of America, New Kensington, Pa., said that special surface treatments are required to prevent moisture penetration into the natural oxide skin, and to provide a good base for painting. Suitable treatments include the nitric acid-sodium dichromate pickle, the hydrofluoric acid-sodium dichromate pickle, and electrolytic pickling in dilute sodium hydroxide followed by immersion in sodium dichromate. For severely corrosive conditions, primers with zinc chromate pigment inhibit corrosion. Phenolic resin varAnd they doubled production-



without adding men, materials or machines:

HOW WOULD you like to see:

Your production of pieces per tool grind upped 300%? Rough grinding operations eliminated? One lathe replace four? Work speeds quadrupled and finishes improved at the same time? More work squeezed from your machines? Troublesome wear problems licked? The parts you make held to extremely close tolerances?

Get these results with Carboloy Tools

In the manufacture of dairy equipment, a simple change to Carboloy Cemented Carbide brought every one of these advantages.

As a result, production more than doubled . . . and in spite of nearly a 16% raise in hourly labor rate, and substantial increases in material costs, cost per piece was *not* increased.

How can you get these results?

The benefits of Carbide can apply to your operations, too. And there's one

sure way to find out how: call in a Carboloy engineer. He has come up against almost every kind of carbide problem, and can bring to your plant his wide knowledge and experience in getting the most from carbides.

His specialized knowledge of carbides, together with the intimate knowledge your engineers have of your particular production problems, will be able to cure many of your production ills . . . even if you're already using carbides to some extent.

Call in your Carboloy engineer

He'll gladly help you—for that's his job. He can assist you, too, in the selection of the most economical tooling from any of Carboloy's 600 standard tools and blanks, or special Carbide-tipped tools made by more than 150 tool manufacturers.

So why not get in touch with him?—or write us direct:

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nish vehicles of medium oil length give good results, and work with vinyl type resins appears quite promising. Baked coatings show improved performance.

George H. Found, Dow Chemical Co., Midland, Mich., presented data on mechanical properties of magnesium alloys, and described a plate bending test for determining endurance or fatigue limit which gives data conforming to field service information. It was pointed out that in fatigue the surface condition was more important than porosity while under impact the porosity decreased

resistance to that condition. Coarse grain size also decreases endurance limit and resistance to impact. Shot blasting increases endurance limit, but greatest increase was found with a combination of machining and burnishing operations.

Mass of evidence accumulated over the past 30 years according to W. S. Loose, Dow Chemical Co., Midland, Mich., refutes the view that magnesium does not possess corrosion resistance. That assumption was based on accelerated salt water tests which now have been shown to have no correlation with actual experience. Proper paint protection is important in corrosive atmospheres. Where moisture remains in contact with magnesium it picks up carbon dioxide and sulphur dioxide and forms acidic solutions which attack the metal.

Electrical Engineers To Discuss Electron Tubes

A means for electronic tube users to discuss their mutual problems with control equipment designers and tube manufacturers is to be presented by the American Institute of Electrical Engineers Conference on the industrial application of electron tubes, in Buffalo, on April 11 and 12. Program for the first day will include a technical session on the application of electron tubes in control and other industrial equipment, an inspection trip to the new Westinghouse plant in Buffalo and a presentation of several papers by users of electron tubes describing their operating experience and maintenance.

Discussion of the items which the equipment manufacturers consider in designing control and other equipment using tubes is to be covered on the second day. This is to be followed by a technical session on the methods used by the electron tube manufacturers in building and rating tubes for industrial applications.

ASTM Acts on New Standards

One of the new standards acted upon by the administrative committee on standards of the American Society for Testing Materials is intended as a general guide for the purchase of austenitic stainless steel pipe and to serve as a basis for agreement where certain details may not be specifically covered. There are five grades of materials (chromiumnickel, chromium-nickel-titanium, chromium-nickel-columbium and two types of chromium-nickel-molybdenum alloys) involving both seamless and welded pipe which is intended for high temperature and general corrosive service. Minimum tensile strength requirements are 75,000 pounds per square inch, with a yield point minimum of 30,000 pounds per square inch. Longitudinal elongation in 2 inches is 35 per cent and transverse 25 per cent.

New tentative test for penetration of liquids into submerged containers, also acted upon by the committee, covers a procedure for determining the amount or extent of penetration of liquids into finished packages or



Your confidence in a stamping source is an item we can't buy—but we can earn it! You see, buyers of small to medium-large stampings across the nation have solid reasons for the trust they place in us—and we invite you to join this distinguished clientel. If your products require coining, as well as blanking, piercing, forming, drawing—or close tolerances—or are suitable for automatic or progressive press operations—we're sure you'll profit from an association in which you find

- 35 years of dependability, promises well-kept
- Broad experience, including extensive tool-engineering "know-how"
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of furnace.

 Coils or straight lengths of copper tubing receive a complete heat treatment in this 'Surface' Radiant Tube Heated, Roller Hearth Conveyor Type Furnace. A DX Prepared Gas Atmosphere is utilized in both the heating and cooling zones to provide a bright surface on the heat treated metal.

The furnace is designed for a temperature range of 700°F. to 1400°F. for the annealing of both straight lengths and coils. The capacity of the furnace depends upon the hearth loading. Actual production figures for

a 24-hour run showed an average of 2000 pounds per hour on straight length tubing.

Whatever your production heat treating need, for ferrous or non-ferrous metals, 'Surface' will design and build a furnace to give the best metallurgical result with a minimum of handling and operating expense.

Many of these furnaces and the processes are described in bulletins, reprints, etc., in the 'Surface' Library of Heat Treating Information. Descriptive materials on equipment and processes of your particular interest are available by writing Department HTC. No obligation.

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO



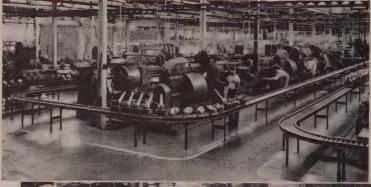
INDUSTRIAL FURNACES.

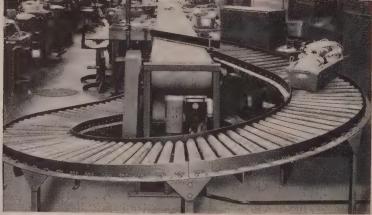
139 February 7, 1949



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Looking for a way to get
material from one part of your
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wouldn't consider the burro as
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—a system, a section or a portable powered
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containers when closed and sealed for shipment. The test may be applied to small packages or to bulk size containers as required. It may apply to containers as packed or after one or more performance, tests such as drum, vibration, drop or actual shipping tests as required: Penetration of liquid is defined as the amount or extent of penetration through the sealed closure, the seams of joints included in the structure of the container and the body or walls of the container.

Mass Handling Techniques Depicted in Movie

Exact methods used in plants of a number of leading manufacturers to make reductions in the costs of materials handling are shown in the sequences of the 30 minute motion picture "The One-Man Gang," produced by Towmotor Corp., Cleveland. According to the company, the purpose of the picture is to show the complete processes for the economical mass handling of materials that one might observe on a personal visit.

Graphically demonstrated is the fact that 80 per cent of the unskilled workers in the average plant are used to move things in the process of production and that 22 per cent of the average payroll goes for such work. The picture presents demonstrations of the various Towmotor models and accessories. Operations made possible by the crane arm, extension forks, revolving carriage, unloader, side shifter and other accessories are shown.

New Railroad Car Journal Bearing Developed

A new compound bore journal bearing for both freight and passenger car service has a secondary bore precision machined in the fore of the standard journal bearing, providing a wider initial contact area with the journal that insures the formation of lubricating film and minimizes the film pressures. This development of National Bearing Division of American Brake Shoe Co., St. Louis, results in a lower temperature run-in and contributes to the reduction of hot boxes during the critical breaking-in period, the company states.

Compound bore is also said to provide a better fit on undersized axles, minimizing the necessary conformation of the bearing to smaller axle sizes. Having passed laboratory and road tests, the new compound bore journal bearing is reported to be already in use on several of the country's railroads.

SPEED CASE STEEL X1515

A LOW CARBON OPEN HEARTH PRODUCT

This shaft machined at 230 S.F.P.M.

It Increases PRODUCTION

It Improves QUALITY

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Our Production expert will survey your plant to show you the possible... increases in Production, improvement of Quality and reduction of your Costs by the use of SPEED CASE or SPEED TREAT steels.



Tear off here

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MANUFACTURERS OF A COMPLETE LINE OF COLD FINISHED CARBON AND ALLOY STEEL BARS

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ACTUAL PHOTOGRAPH

Speed Case Steel (.20 carbon) 1 inch cold drawn bar tied in a knot, cold, without fracture.

And Wolverine Trufin

can do as much for YOU

The use of Wolverine Trufin, the integral finned tube, enabled a manufacturer to produce a heating unit that offered his customers

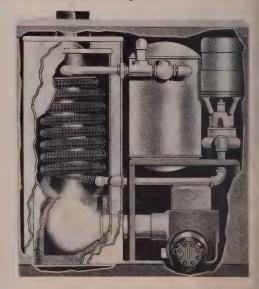
MORE HEAT AT LESS COST



Just as it has brought advantages to this manufacturer—and thousands of others—in one way or another—by increasing efficiencies, bringing economies, improving design, etc.—this unique tube can bring benefits to YOU if you incorporate it as a component in your heat exchanger or other similar product.

In describing this Auburn Aqua-Finn Heater, the manufacturer points out that "copper was utilized in its construction to provide the utmost in heat with a minimum of fuel. Copper is five times as effective in conducting heat as iron, and seven times as effective as steel. With such efficiency, fuel consumption is cut 25% over other types of boilers... One inch of this finned tubing has the same heat exchange capacity as eight inches of the same size tubing without fins."

The cut-away diagram shows how a small coil of Trufin is used to effect this high efficiency. Because the fins are integral with the tube itself, Trufin will withstand vibration and extreme temperature changes. It can be bent easier than plain tube—and without special tools. It is available in a variety of diameters, alloys, fin heights and spacings.





WOLVERINE TUBE DIVISION
CALUMET AND HECLA CONSOLIDATED COPPER COMPANY

INCORPORATED

MANUFACTURERS OF SEAMLESS NON-FERROUS TUBING

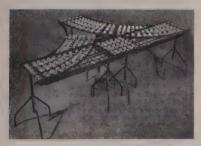
1439 CENTRAL AVENUE

DETROIT 9, MICHIGAN

New Products and Equipment

Conveyor Switch

Speedways Conveyors Inc., 1261 Niagara St., Buffalo 13, N. Y., is manufacturing a 45 degree Flipswitch for installation on gravity conveyor lines. With it, the flow of materials can be diverted on a 45 or 90 degree curve easily and quickly or kept going straight ahead. Material flow is con-



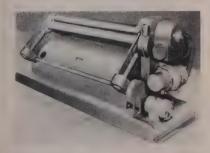
tinuous, there being no stopping or starting in the transfer of cases, boxes, crates, etc., from one line to another

Switch is available for 12, 15 or 18 inches wide standard Speedways conveyors. The main trunk has hooks at both ends; the 45 degree spur has studs for quick, easy joining with other conveyor sections. Frames are of welded 2 x 1 x 1/8-inch steel channels, with 2-inch ball-bearing roller wheels rotating on cold rolled steel axles. Approximate measurements are 45 inches long and 30 inches wide.

Check No. 1 on Reply Card for more Details

Bending Rolls

Reed Engineering Co., 1003 West Fairview Ave., Carthage, Mo., is producing a new series 600 plate bending rolls, equipped with three 6-inch diameter forged steel rolls. The heavy duty machine features all-steel construction and is driven through a



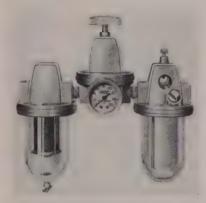
totally enclosed worm gear drive. All bearings are made of solid bronze. Main frame and housings are built of welded construction. Housings are connected with antitorque type connectors.

Machines are built with an automatic drop end which raises the top roll when the drop end is lowered for removal of fully rolled circles. Standard equipment includes a 5 horsepower squirrel cage motor with reversing control, three-roll drive to main rolls and manual roll adjustment to two lower rolls. Four standard sizes are built with working lengths of 50, 62, 74 and 98 inches.

Check No. 2 on Reply Card for more Details

Compressed Air Conditioner

Compressed air is cleaned and purified, its pressure automatically controlled and atomized oil added for internal lubrication of moving parts in tools, cylinders and other air powered equipment with the Air War-



den unit, developed by Hannifin Corp., 1101 South Kilbourn Ave., Chicago 24, Ill. The unit continuously removes impurities as small as 50 microns as well as eliminating moisture and emulsified oil.

Pressure regulator design insures protection against accidental pressure build-up. The lubricator is constructed of noncorrosive materials and is suitable for use on primary air pressures up to 150 pounds per square inch. The air conditioning unit is offered in 3/8 and 1/2-inch sizes.

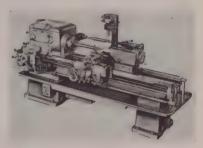
Check No. 3 on Reply Card for more Details

Dual Purpose Lathe

Announced by Lodge & Shipley Co., Cincinnati 25, O., is a new tracer-controlled dual-purpose lathe, known as the Copymatic. It embodies an all-hydraulic tracer control in the company's standard model X 16-inch, 20-inch medium and heavy duty, and 25-inch medium duty lathes. Conversional Conversions of the Conversion o

sion from standard lathe operation to automatic duplication and vice versa is instantaneous, being accomplished by turning two valves and a switch.

On duplicating work, the tracer will operate from round or flat templates, doing any type of turning or boring jobs within the range of the lathe equipped with tracer control. Multiple diameter shafts with square shoulder faces, tapers in both directions, chamfers, etc., are reproduced to a



high degree of accuracy. If the first piece of a lot can be machined by standard operation of the latthe, this piece can be subsequently used as a template. The swing capacity of the standard lathe is maintained. Hydraulic pump and motor, purolator, air filter, tracer head and one stylus plus valves and switches, clutch and brake are included in the equipment furnished.

Check No. 4 on Reply Card for more Details

Induction Heater

A 2-1/2 x 3-15/16-inch steel blank is delivered at a closely controlled temperature of 2200° F every 4.8 seconds with the new induction heater announced by Ajax Electrothermic Corp., Trenton 5, N. J. With the 750 blanks delivered to the mouth of the



forging machine every hour, the operator can place the billets into the dies at a high rate of production without extra steps. Due to fast heating time, there is little time for scale to form, thereby reducing down time required to clean out dies.

Blanks are fed into a chute and sub-

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February 7, 1949



*The change that improved the honing operation cited above was a mixture of ThredKut 99 recommended by a D. A. Stuart Oil Co. representative. ThredKut 99 is easily mixed or blended whenever a special operation calls for its unusual qualities. Ask for a booklet on D. A. Stuart's ThredKut 99 and other time-tested cutting fluids.



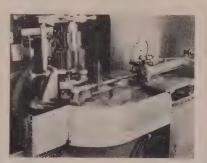
27351/2 S. TROY ST., CHICAGO 23, ILLINOIS

sequently fed into the heating coil by a hydraulic pusher. Timing is fully automatic. The heater can handle a wide variety of forging blanks. Illustrated heater will accommodate square or round billets up to 2-1/2 inches in diameter. As the coils themselves are interchangeable, they may be substituted to give greater efficiency on long-run small diameter work, or to accommodate diameters larger than 2-1/2 inches. Power source is a 700-kilowatt, 960-cycle motor generator unit, of which 100 kilowatts is held in reserve for larger billets or a shorter timing cycle.

Check No. 5 on Reply Card for more Details

Gear Hardening Machine

Hardening of gear teeth, one tooth at a time, by induction heating is possible with the automatic heating, quenching and indexing unit developed by Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y. Handling operations involve only the insertion and removal of gears. Large



gears which would require very large equipment to be hardened in one operation, can be done with this 20 kilowatt equipment.

Gears ranging from 20 inches in diameter and with a face of 12 inches or larger can be accommodated by this unit, depending upon generator capacity. Individual teeth of a carbon steel helical gear with a pitch diameter of 10½-inches and a 3-inch face with 46 teeth are heated and quenched in 7 seconds to a rockwell C hardness of 50 to 64. Pressing the start button after the gear is inserted automatically indexes, heats and quenches every tooth in sequence.

Check No. 6 on Reply Card for more Details

Self-Leveling Rack

Maintenance of the same working level and continuous flow of parts or material, timed to the worker's individual capacity, serves to increase production through use of the industrial Lowerator, developed by American Machine & Foundry Co., 485 Fifth



Continental CASTING AND MACHINING FACILITIES

handle a range from 50 lbs. to 250,000 lbs.

CONTINENTAL regularly produces all sizes of intricate and unusually designed castings in any analysis of cast steel and in sizes from 50 lbs. to 250,000 lbs. Three large capacity foundries keyed to either custom or production operation and two heavyduty machine shops offer you promptly scheduled delivery on a wide size range of castings to your specification. Send your drawings for quotation.



Ave., New York 17, N. Y. This automatic, spring-powered rack holds a bank of material and brings each piece to the operator's hand-level as soon as the preceding piece has been removed. Physical back strain and accident factors involved in manual lifting of loaded tote boxes or in lifting materials to working level are eliminated.

To reload, the material is placed on the platform and it automatically



finds its proper level. Being activated by self-contained springs, rack requires no outside power source and is smooth in action. Both open and closed side types are available; the latter type is illustrated. Casters provide for moving the racks around the shop.

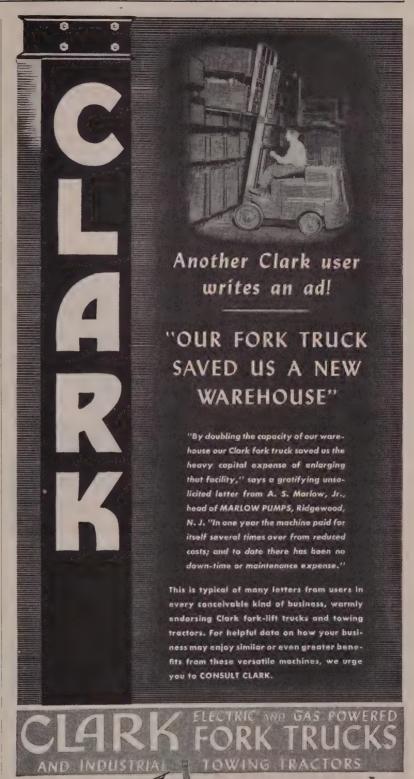
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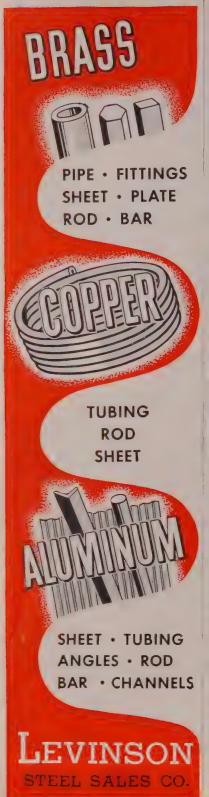
Inspection Gage

Fast, simultaneous inspection of two diameters may be effected with the two-channel inspection gage developed by Graham-Mintel Instrument Co., 2443 Prospect Ave., Cleve-



land 15, O. Its induction type measuring heads operate without friction and are provided with 0.025-inch range of fine adjustment for ease in setups to various sizes and correc-





32 PRIDE STREET . PITTSBURGH, PA.

tions for wear. Each head is independently adjustable. Zero setting is done on master gages.

Heads can be applied to existing stands with only a few changes in many cases, or stands best suited to the range and sizes of workpieces can be supplied. Amplifier operates on 110 volts, 60 cycles and is voltage regulated from 95 to 125 volts. The two continuous linear scales are divided into 0.005 to 0.0005-inch. having approximately 5/16-inch spacing per thousandth or tenth, thereby allowing fast reading to 0.000001-inch.

Check No. 9 on Reply Card for more Details

Flash Welder

Agnew Electric Co., Milford, Mich., is announcing a hydraulically operated flash welder that is completely automatic except for loading and unloading. While its hydraulic pump supplies the pressure to actuate the movable platen and a flow valve con-



trols the flash cycle, air is used for clamping. Dies are replaceable inserts which not only minimize die cost but which also make practical a broad application of work.

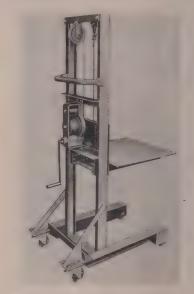
Tap switch on the transformer of the type HAB machines provide a wide heat range for diversified production. The welder is equipped with water-cooled 50 kilowatt - ampere transformer and clamps, welder type magnetic contactor and necessary pressure controls.

Check No. 10 on Reply Card for more Details

Portable Elevator

Loads up to 500 pounds may be lifted from 1 to 5 feet with the oneman-operated portable elevator announced by Barrett-Cravens Co., 4609 South Western Blvd., Chicago 9, Ill. Applications include placing dies in presses or die racks, loading and unloading motor trucks, raising loads to platforms and for ceiling and lineshaft repairs.

To operate, crank is turned in one direction for raising the platform and reversed for lowering. Capacity loads are easily raised or lowered and can be stopped at any point on the way up or down. Elevator platform is 24 inches square and base of load handled is limited to 30 x 42



Platform when lowered is 5¾ inches off the floor. Unit has all welded construction, spur gear reduction and floor brake.

Check No. 8 on Reply Card for more Details

Dipping Machine

Wiesner-Rapp Co. Inc., 1646 Seneca St., Buffalo 10, N. Y., is introducing an automatic dipping and agitating machine, for applications requiring consecutive dipping and controlled agitating operations. By plac-



ing the load in the container or holder and pushing the start button, the load is automatically conveyed to the first tank, dipped and agittated for a predetermined time interval which may be quickly changed for various operations.

Loaded container is then automatically lifted and moved to the second NEW PRODUCTS and EQUIPMENT-

tank and again dipped and agitated for a predetermined time interval. It is then either returned to the first tank or moved on to a third tank. The entire cycle continues until the number of cycles are completed, as preset on the built-in counter. Upon cycle completion, the load automatically returns to the starting position.

Check No. 11 on Reply Card for more Details

Speed Reducer

Ohio Gear Co., 1359 East 179th St., Cleveland 10, O., is manufacturing the BHS single reduction speed reducer, a right angle drive with input shaft below and worm gear or output shaft above. Overall dimensions are 4% inches long, 3 inches



wide and 6¼ inches high. Available ratios range from 6-1 to 58-1, input horsepower from ½ to ½ and output torque (at 1800 revolutions per minute input) from 103 to 168 inch-pounds, depending upon the ratio.

Input shaft diameter is ½-inch with a 1½ inch extension; output shaft diameter is ½-inch, with 1 15/16 inch extension. Housing is of aluminum alloy. Worm is of high grade carborized steel and worm gear is of special nickel bronze.

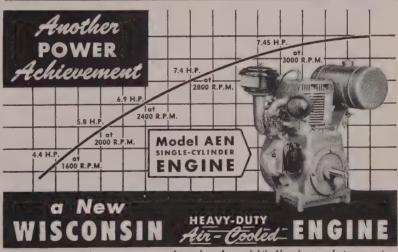
Check No. 12 on Reply Card for more Details

Air Conveyor

Announced by Fuller Co., Catasauqua, Pa., is a conveyor for transporting fine, dry materials without the use of moving parts. The conveyor comprises an inclined porous medium which supports a stream of material, sufficiently fluidized by air passing through the medium, that gravitational force causes the material to flow. Called the Airslide, it features a porous medium of low-air permeability, assuring uniform distribution of low-pressure air in an air chamber below the porous medium.

Conveyors of this type have been used to convey such materials as soda ash, lime, lye ash and iron ores. Ad-





Lower cost, more horsepower at normal speeds ... less weight! Already, manufacturers and users alike are praising these features of the new heavy-duty air-cooled Model AEN $7\frac{1}{2}$ hp. single-cylinder engine.

As shown, it develops peak horsepower well within normal speeds, yet weighs only 126 pounds...less than any comparable engine.

Advanced engineering design alone is responsible for the added power, decreased weight and lower cost per delivered horsepower. Every part is machined to traditional close tolerances. Every service-proved, heavy-duty feature still remains . . Timken tapered roller-bearings at both ends of the crankshaft; jet and spray oiling, etc.

Write today for additional data. Other Wisconsin Air-Cooled Engines available in Single Cylinder, 2-Cylinder and 4-Cylinder Models, 2 to 30 hp.



vantages derived from the use of this conveyor are: Extremely low power consumption; small volume of air at low pressure; dustless operation; high capacity with low head room; and noiseless operation. Maintenance cost is low and lubrication and industrial accident hazards are eliminated.

Check No. 13 on Reply Card for more Details

Drill Jig

Flexibility, speed and accuracy are combined in the model X-750 Kam-Grip drill jig, designed for production precision drilling by Manufacturers Engineering Service, Security Bldg., Toledo, O. The work part is positioned in a V locating block on



the underside of the bushing plate, assuring accurate centering of the work in relation to the drill.

One double-end anvil and one bushing plate are used to make the jig adjustable for all work from ½ to more than ¾-inch in diameter with drill sizes up to 11/32-inch using standard slip drill bushings. Clamping is accomplished by cam action. Work is held rigidly with a cushioned pressure grip which eliminates marring or scratching. It is furnished with a locking-release rod for attachment to the drill press quill.

Check No. 14 on Reply Card for more Details

• • •

ANNUNCIATOR: An annunciator, measuring 10 inches in width, is offered by Autocall Co., Shelby, O. Designation windows are $2 \times 4\frac{1}{2}$ inches and the unit can be made up to contain as many windows as required. Check No. 15 on Reply Card for more Details

BORING TOOLS: E-Z set boring tools are available in models No. 30, 31 and 32 with maximum boring bar

capacities of ½, 1 and 1½ inches respectively from the Maxwell Co., Bedford, O. These tools cover a boring range from ¾ to 20 inches. All models have boring bars and socket keys as standard equipment.

Check No. 16 on Reply Card for more Details

HARD FACING ALLOYS: Two new hard facing alloys have been developed for added wear protection on heavy equipment by Stoody Co., Whittier, Calif. Self-hardening 21 is for applications involving extreme abrasion with moderate impact and 1027 for severe impact with moderate abrasion.

Check No. 17 on Reply Card for more Details

MOTORS: Falk Corp., Milwaukee 8, Wis., offers a line of All-Steel Motoreducers that includes horizontal and vertical units in both integral and all-motor types, for floor, wall or ceiling mount. Basic Motoreducer unit can be converted to right angle, V-belt, multispeed, low ratio, ceiling mount and other adaptations.

Check No. 18 on Reply Card for more Details

REAMER: Taking five cuts in one pass—end, taper, face, chamfer and outside diameter—a carbide-tipped special form reamer is made by U. S. Carbide Tool Inc., Cleveland 4, O. Check No. 19 on Reply Card for more Details

PROTECTIVE COATING: American Chemical Paint Co., Ambler, Pa., announces Alodine, a surface treating chemical for aluminum which produces a protective coating in an extremely short time.

Check No. 20 on Reply Card for more Details

CONTROL VALVE: Designed for use on all types of combustion systems controlled by air, where a smooth, gradual high-low control action is desired, the improved CR McKee automatic temperature control valve is offered by Eclipse Fuel Engrg. Co., Rockford, Ill.

Check No. 21 on Reply Card for more Details

BATTERY CELL TESTER: No. 601A high discharge cell tester offered by Sterling Mfg. Co., Cleveland 2, O., has scale readings of dead, weak and ok. Without removing battery, tester locates defective cells and indicates dead or short circuit cells.

Check No. 22 on Reply Card for more Details

HYDRAULIC GAGE: A hydraulic dial gage, known as Hydrodial, offered by A Schrader's Son, Division of Scovill Mfg. Co. Inc., Brooklyn,

N. Y., has large clear calibrations that can be read at a distance of 50 feet. It is made in nine pressure ranges, lowest of which is 5-50 pounds and maximum 500 - 5000 pounds.

Check No. 23 on Reply Card for more Details

WORK BENCH: A heavy duty work bench made with 11-gage prime steel top and 13-gage prime steel channel type legs is being marketed by Tri-State Metal Products Inc., Pittsburgh 30, Pa. It is 32 inches high, 28 inches wide and 72 inches long.

Check No. 24 on Reply Card for more Details

WHEEL BRUSH: Fuller Brush Co., Hartford 2, Conn., announces a new kind of wheel brush called Fullerdisc. It has no separate adapters as they are built into the side plates. Side plates are heavy gage, cadmium plated and adapted to fit all shaft sizes from ½ to 1 inch. Fullerdiscs are available in diameters from 5 to 9 inches in a choice of three materials.

Check No. 25 on Reply Card for more Details

COAL-FIRED HEATER: A coal-fired warm air space heater that can be converted for firing with gas or oil is announced by Dravo Corp., Pittsburgh 22, Pa. The unit features a stainless steel combustion chamber. It is available in two output capacities, 1,250,000 Btu per hour and 1,500,000 Btu per hour.

Check No. 26 on Reply Card for more Details

WELDING HEAD: Elge Associates, New York 21, N. Y., offer a new portable welding head for arc welding which produces continuous welds using standard coated electrodes.

Check No. 27 on Reply Card for more Details

ELECTRODE: A new phosphor bronze electrode for the metallic arc welding of copper, tin bronzes, brasses, cast and malleable iron, galvanized iron and dissimilar metals is available from All-State Welding Alloys Co. Inc., White Plains, N. Y. It is made in a range of sizes including 3/32, 1/8, 5/32 and 3/16-inch.

Check No. 28 on Reply Card for more Details

FOR MORE INFORMATION

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

3. Bronze

Johnson Bronze Co.—84-page illusrated 1949 catalog No. 490 contains omplete data on bronze general purose bearings, universal cored bars, olid and hexagon bars, babbitt, raphite bearings, Ledaloyl self-oiling earings and electric motor bearings. Practically any size, quantity or type of bearing bronze product can be hipped directly from stock.

4. Punch Press Feeder

H. E. Dickerman Mfg. Co.—1-page flustrated data sheet gives specifications of new 9-inch Rol-Di-Feed automatic punch press feeder. This mit is self-contained cam driven detice which can be installed easily on ress bolster, and in some cases diectly on die shoe. It feeds stock utomatically in any desired direction rate.

15. Power Truck Drive

Clark Equipment Co., Industrial Cruck Div.—12-page illustrated buletin "Clark Presents the New and Sevolutionary Dynatork Drive" explains operation and advantages obtainable with new transmission which permits driving gasoline-powered lork lift trucks by means of magnetic induction to give smooth, positive operation.

76. Abrasive Products

Allison Co.—Illustrated bulletins Nos. 4948B, 1948BR, 2948P and 4948R are descriptive of resinoid conded abrasive cut-off wheels, ball-cace grinding wheels, rubber bonded polishing and abrasive cut-off wheels respectively.

77. Centrifugally Cast Alloy

Ampco Metal, Inc.—2-page illustrated stock list card gives available sizes and other data on grade 18 Ampco Metal. This centrifugally cast alloy is suitable for bearings, gears, worm wheels, slides, guides and other wear applications.

78. Blowers

Roots-Connersville Blower Corp.—20-page illustrated bulletin 22-23-B-13 outlines principal uses for rotary positive blowers which are available in wide range of sizes and four standard types. Available accessories, specifications, and engineering data are covered.

79. Mobile Cranes

Byers Machine Co.—24-page illustrated catalog No. 1248 depicts mobility and versatility of model 61W and 71W Byers Traveler excavators and cranes with capacities of ½ and ¾-yard respectively. Adaptability of these rubber tired cranes to construction work and general industrial materials handling jobs is shown.

80. Precision Lathes

South Bend Lathe Works—64-page illustrated catalog No. 100-G presents complete data on line of 9, 10, 13, 14½, 16 and 16/24-inch swing precision, quick change gear and toolroom lathes, and on ½ and 1-inch collet capacity turret lathes. Major lathe attachments and accessories for these machines are covered.

81. Stainless Steel Thermometer

W. C. Dillon & Co., Inc.—4-page illustrated bulletin T presents many features which make instrument suitable for a large number of industrial applications. Available in either Fahrenheit or Centigrade scales, thermometer employs large heat-resistant dial which can be read from considerable distance.

82. Totally Enclosed Motors

Allis-Chalmers Mfg. Co.—4-page illustrated bulletin 05B7150 describes removing heat losses of motors without exposing electrical parts to harmful atmospheric conditions. Motors are available in squirrel-cage, wound rotor and synchronous types for vertical or horizontal installation. They can be made explosionproof to qualify for Class I Group D service.

83. Stampings

Detroit Stamping Co.—10-page illustrated booklet "Stampings" describes facilities available for production of wide range of metal stampings ranging from small to medium large.

84. Centrifugal Die Castings

Lebanon Steel Foundry—12-page illustrated bulletin "Centri-Die Castings" explains production of centrifugal castings in permanent molds and shows typical cross sections and products which can be made. Specifications, analyses and application tables are included on carbon, low alloy, heat resistant and corrosion resistant alloys.

85. Die Production Methods

Mardigan Corp.—16-page booklet entitled "Hatching Ideas Into Dies" is guide to solving die and production problems.

86. Storage Racks

Abell-Howe Co.—4-page illustrated folder "EconoRack" presents facts concerning standard storage rack construction and applications. Racks can be designed to meet individual requirements for material storage.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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87. Cranes

Euclid Crane & Hoist Co.-24-page illustrated catalog "Euclid Cranes" gives details of bridge girders, trolleys, bridges and other components of line of electric cranes which are available with capacities from 1/2 to 100 tons and for spans up to 100 feet.

88. Instrument Transformers

General Electric Co., Meter & Instrument Div.—80-page illustrated catalog No. GEA-4626B contains detailed information on 107 types of standard instrument transformers and gives prices, ratings and other

89. Air & Hydraulic Cylinders

Miller Motor Co.-2-page illustrated pressure and flow charts for air and hydraulic cylinders aid in selection and application of cylinders ranging in diameter from 11/2 to 20 inches. Data are included on hydraulic circuits and friction pressure

90. Synchronous Generators
Elliott Co.—4-page illustrated bulletin PB-2400-1 describes Fabri-Steel synchronous generators which are of high speed type for belt drive or direct connection to diesel engine or geared to steam turbine.

91. Pyrometer Accessories

Bristol Co. - 56-page illustrated bulletin P1238 presents detailed information on thermocouples, protection tubes and other pyrometer accessories. Technical section or "Users' Manual" contains engineering handbook data while catalog section or "Buyers' Guide" is indexed and illustrated with line drawings and photographs.

92. Chucks
E. Horton & Son Co.—8-page illustrated condensed catalog No. C48 contains specifications and list prices of work holding chucks for lathes, drill presses and special applications. Among types described are four-jaw independent, scroll universal, four-jaw scroll combination, three-jaw combination, keyless drill, face plate and boring mill, two-jaw lathe and power chucks.

93. Steel Buildings

Luria Engineering Corp.—20-page illustrated bulletin "Standard Buildings by Luria" shows construction features of these rigid-frame permanent structures which are available in wide range of standard sizes with clear span widths from 40 to 100 feet, center column types from 50 to 100 feet wide and with crane runways from 40 to 80 feet wide.

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2-7

94. Handling Equipment

Rolock Inc. - 36-page illustrated catalog B-7 describes heat and corrosion resistant alloy fabrications such as muffles, retorts, carburizing boxes, annealing tubes, brazing trays and racks, furnace trays, baskets, disks and fixtures. All equipment is job-engineered and welded.

95. Industrial Furnaces

Surface Combustion Corp.—8-page illustrated folder No. SC-141 contains brief descriptions and suggests uses of line of industrial furnaces which includes atmosphere, muffle, laboratory, oven, forging, pot and convection types. Also covered are atmosphere generators, air heaters. and metal melting furnaces.

96. Measuring Microscopes

Gaertner Scientific Corp.—24-page illustrated bulletin 161-48 describes micrometer microscopes, traveling microscopes, micrometer slide comparators, instruments for measuring creep and thermal expansion, and many different accessories. Introductory section contains information on selection and use of measuring microscopes, their combination and method of calibration.

97. Copper and Copper Alloy

American Brass Co.—28-page book B-34 is in two sections. First lists Anaconda's most generally used alloys, together with all applicable specifications; second lists specifications in numerical order with brief description of materials as to grade, type, temper and anneal. Both sections are side indexed for ready ref-

98. Welding & Cutting

Eutectic Welding Alloys Corp.—6-page illustrated folder entitled "Why Not Eliminate Costly Cast Iron Welding Failures" discusses application of Eutectrode 24/49 to welding of cast iron and covers cutting and chamfering of cast iron with Cut-

99. Lateral Tank Ventilation

DeBothezat Fans Div., American Machine & Metals, Inc.—36-page illustrated bulletin DT-7-48 presents design data for lateral tank ventilation including standard two-sided lateral exhaust, rear manifold exhaust with or without baffle, rear manifold and front slotted duct and push-pull system. Typical problems are given and several reference charts provided.

100. Magnetic Contactors

Ward Leonard Electric Co.-4-page illustrated folder is descriptive of bulletin 4454 and 4455 multiple pole magnetic type contactors which are rated 150 and 300 amperes respectively. Ratings are given on controls for different classes of service.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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Market Summary

STEEL markets are rapidly assuming a more normal aspect. Stringency in supplies of the major products continues but the signs increasingly point in the direction of supply-demand balance in most items before many more months pass.

Survey by STEEL shows metalworking companies are getting quicker deliveries on practically all products. For example, sheets and strip, which have been in most critical supply since the end of the war, today are available in 86 days against 112 six months ago. At the same time, consumers' inventories are larger, in days of operation, than they were last July.

PROSPECTS— Expanding steelmaking capacity, continued high production and slackened requirements from some consuming directions are definitely serving to relieve steel demand pressure. Lessening international tension, however superficial, also appears to be exerting a dampening influence on market sentiment. While the mills continue to ship in unabated volume the buying caution evidenced in recent weeks appears to be intensifying. Some consumers are apprehensive of a collapse in demand with buyers withdrawing from the market holding larger inventories than now suspected. For the most part, however, the great majority of consumers, and the steel producers, anticipate no severe contraction in buying.

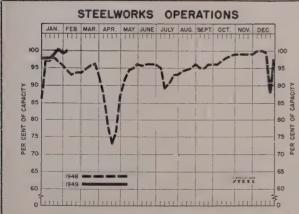
PREMIUM TONNAGE—Up to the present time the easing in pressure on the market has largely involved so-called premium tonnage. This is in line with expectations. Considerable premium tonnage continues to move into consumption, however, with various mills throughout the country continuing to quote prices well above the generally recognized market level. Some of these prices may be in for fairly early downward adjustment. In fact, increasing resistance to premium prices is reflected quite markedly in the growing number of conversion deals which are not being extended upon ex-

piration. Some have been cancelled outright.

GRAY MARKET—Continued outpouring of gray market tonnage at lower prices is another manifestation of the fact that while consumers are still short of the major carbon steel products, they are moving much more conservatively in covering their requirements. Not only are they refusing to pay extremely high gray market prices but are becoming more finicky with respect to specifications. Imported steel is attracting less and less interest for this reason, and in foreign pig iron, the placing of new business has virtually ceased, apart from scattered tonnages that are already in this country or nearing port.

PRODUCTION—Maintaining the record production pace in effect since the first of the year, the steel mills last week operated at 100 per cent of capacity, a gain of ½ point over the preceding week. Maintenance of the national ingot rate at the January average level through the remainder of the year would result in an alltime record steel output of well in excess of 95 million tons of ingots.

PRICES - Except for a number of upward adjustments in extras, chiefly reflecting increases in coating costs, the steel price structure is holding steady. As pointed out above, premium prices are under pressure and gray market prices have been drastically slashed. However, there is as yet no sign of weakening in the standard market and costs still are exerting an upward pressure on established schedules. Continued weakness in the scrap market last week resulted in a further drop of 91 cents per ton in STEEL's composite for steelmaking scrap which fell to \$39.42. This is the lowest point recorded since October, 1947, and compares with \$40.58 in the like week a year ago. Composites held unchanged last week on finished steel at \$97.77, semifinished steel at \$75.75, and on steelmaking pig iron at \$46.22.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

Week			
Ended		Same	Week
Feb. 5	Change	1948	1947
Pittsburgh 98.5	- 0.5	90	94.5
Chicago 99.5	+ 1	92.5	91
Eastern Pa 97	None	91	89
Youngstown105	None	102	89
Wheeling 95	+ 8.5	90	89
Cleveland102	i 5	94.5	96.5
Buffalo104	None	83.5	90.5
Birmingham100	None	100	99
New England 87	None	80	88
Cincinnati105	+ 2	87	91
St. Louis 84.5	None	78	72
Detroit102	- 2	92	84
Estimated national			
rate100	+ 0.5	94	92.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947.

COMPOSITE MARKET AVERAGES

Arithmetical Price Compos	sites*		Month Ago	Year Ago	5 Years Ago	FINISHED STEEL WEIGHTED COMPOSITE†
	Feb. 5	Jan. 29	Jan. 1949	Feb. 1948	Feb. 1944	
Finished Steel Semifinished Steel Steelmaking Pig Iron Steelmaking Scrap	75.75 46.22	\$97.77. 75.75 46.22 40.33	\$97.75 75.75 46.26 41.54	\$79.86 67.16 39.30 40.48	\$56.73 36.00 23.00 19.17	Dec. 1948 4.11778c Nov. 1948 4.11778c Oct. 1948 4.12950c Dec. 1947 3.49055c Dec. 1943 2.38649c

*STRAIGHT ARITHMETICAL COMPOSITES: Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods, on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, doilars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black leactric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. December, 1948 figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

rinished materials					rig iron	
	Feb. 5, 1949	Jan. 1949	Nov. 1948	Feb 1948	Feb. 5, Jan. I	Nov. Feb 1948 1948
Steel bars, Pittsburgh mills	3.45c	3.45c	3.45c	2.90c	Bessemer, del. Pittsburgh (N. &S. sides) \$48.08 \$48.08 \$4	\$40.996 6.00 \$9.00
Steel bars, del. Philadelphia Steel bars, Chicago mills	3.8164	3.8094 3.35	3.79 3.35	$\frac{3.356}{2.90}$		0.17 42.004
Shapes, Pittsburgh mills	3.275	3.275	3.275	2.80	No. 2 fdry., del. Pgh. (N.&S. sides) 47.58 47.58 4	7.58 40.496
Shapes, Chica Tills	3.25	3.25	3.25	2.90		50.67 42.504 6.25 39.00
Shapes, del. Philadelphia	3.4918 3.50	3.4888 3.50	3.48 3.50	2.968 2.95	No. 2 foundry, Valley 46.50 46.50 4	6.50 39.50
Plates, Chicago mills	3.40	3.40	3.40	2.95		3.38 37.88 9.09 40.74
Plates, del. Philadelphia	3.7256 3.275	3.7217 3.275	3.71	3.19 2.80		6.50 39.50
Sheets, cold-rolled, Pittsburgh	4.00	4.00	3.275 4.00	3.55		6.50 39.50
Sheets, No. 10 galv., Pittsburgh.	4.40	4.40	4.40	3.95		36.00 55.00 3.00 151.00
Sheets, hot-rolled, Gary mills Sheets, cold-rolled, Gary mills	3.25 4.00	3.25 4.00	3.25 4.00	2.80 3.55		
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.95	* F.o.b. cars Pittsburgh.	
Strip, hot-rolled, Pittsburgh mills Strip, cold-rolled, Pittsburgh mills.	3.275 4.375	3.275 4.375	3.275 4.375	2.925 3.675	Scrap	
Bright basic, wire, Pittsburgh	4.325	4.325	4.325	3.775		2.75 \$40.44
Wire nails, Pittsburgh mills	5.775	5.775	5.775	4.95		1.50 39.125 1.75 39.125
Tin plate, per base box, Pitts. dist.	\$6.70	\$6.80	\$6.80	\$6.70	Heavy melt. steel, No. 1 Valley 37.75 39.75 42	2.75 40.25
Camifiniah ad						2.25 39.75 8.50 43.63
Semifinished					Rails for rerolling, Chicago 51.00 59.38 69	9.50 51.00
Sheet bars, mill		\$67.00*	\$67.00*	\$56.79	No. 1 cast, Chicago 47.50 58.38 70	0.50 66.00
Rerolling billets, Pittsburgh					Coke	
Wire rod 32 to 4-inch, Pitts. dist	3.775e	3.775c				4.50 \$12.50
Nominal.						
Sheet bars, mill Slabs, Chicago Rerolling billets, Pittsburgh Wire rod 3/3 to 1/4-inch, Pitts. dist * Nominal.	52.00 59.00	52.00 59.00	52.00 59.00	42.59 42.59	No. 1 cast, Chicago	0.50 66.00 4.50 \$12.50 7.00 14.78 0.40 18.00

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Einishad Matarials

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, \$100-\$105 per gross ton. Forging quality, \$50 per net ton, mill. Alloy Steel Ingots: \$51 per net ton, mill. Rerolling Billets, Blooms, Slabs: \$52 per net ton, mill, except: \$62, Conshohocken, Pa.; \$66, Monessen, Pa.; sales by smaller interests on negotiated basis at \$85 per gross ton, or higher. Forging Quality Billets, Blooms, Slabs: \$61 per net ton, mill, except: \$68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, \$63 per net ton, mill except: \$70, Conshohocken, Pa.

Soo fee Net out, him except. \$70, Constitutions on Park 110-\$115 per gross ton. Skelp: 3.25c per lb, mill.

Tube Rounds: \$76 per net ton, mill; some sellers quoting up to \$120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & %-lenh, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill. 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 4.40c, Atlanta; 5.30c, Frontana, Calif.
Rail Steel Bars: (Base 10 tons): 3.35c, Moline, III., 5.10c, Williamsport, Pa.; another interest quotes 5.35c, mill.

range of sizes, grades, finishes and specificat

Hot-Rolled Alloy Bars: 3.75c, mill, except:
4.05c, Ecorse, Mich.; 4.80c, Los Angeles;
5.50c, Fontana, Calif.
Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis;
4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.;
4.35c, St. Louis; 4.36c, Plymouth, Mich.;
4.40c, Newark, N. J., Hartford, Putnam,
Conn., Mansfield, Readville, Mass.; 4.50c,
Camden, N. J.; 5.30c, Los Angeles,
Cold-Finished Alloy Bars: 4.65c, mill, except:
4.75c, Monessen, Fa.; 4.85c, Indianapolis;
4.95c, Worcester, Mansfield, Mass., Hartford,
High-Strength, Low-Alloy Bars: 5.10c, mill,
except: 3.0c, Youngstown; 5.40c, Ecorse, Mich.
Reinforcing Bars (New Billet): 3.35c, mill,
except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg,
Torrance, Calif.; 4.10c, Atlanta, Seattle, S.
San Francisco, Los Angeles; 4.25c, Minnequa,
Colo, Fabricated: To consumers: 4.25c, mill,
except: 5.00c, Seattle. except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williams.

port, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: Wrought Full Bars: Single Remeat. 5.00c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c. Pittsburgh; 3.45c. Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O.; 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich.; 4.70c, Granite City, Ill.; 4.95c, Pittsburg, Calif.
Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill. except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Koko-Ind.

Galvannealed Sheets: 4.95c. mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c,

Indiana Haroor, Ind.; 6.50c, Niles, O.; 5.70c, Kokomo, Ind.
Culvert Sheets, No. 16 flat Copper Steel
(based on 5-cent zinc): 5.00c, mill, except:
5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.;
5.75c, Pittsburg, Torrance, Calif.
Long Ternes, No. 10 (Commercial quality):
4.80c, mill.
Framewilly Sheets, No. 12: 4.40c, mill. except:

5.76c, Pittsburg, Torrance, Call.

Long Ternes, No. 10 (Commercial quality):
4.50c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except:
4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.;
6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill,
Armature: 5.45c, mill, except: 5.95c, Warren,
O.; 6.05c, Niles, O.

Electrical: Hot-rolled, 5.95c, mill, except:
6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.;
6.45c, Warren, O.; 6.55c, Niles, O.

Motor: 6.70c mill except: 6.90c, Granite City,
Ill.; 7.20c, Warren, O.; 7.95c, Follansbee, W.
Va., Toronto, O.; 9.20c, Brackenridge, Pa.
Dynamo: 7.50c, mill, except: 8.65c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City,
Ill.; 10.00c, Brackenridge, Pa.
Transformer 72, 8.05c, mill, except: 9.15c,
Follansbee, W. Va., Toronto, O.; 11.80c,
Frackenridge, Pa.; 58, 9.30c, mill except:
9.85c, Follansbee, W. Va., Toronto,
13.05c, Brackenridge, Pa.; 52, 10.10c, mill.
except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled
4.95c, mill, except: 5.15c, Youngstown; 5.25c,
Ecorse, Mich., and Conshohocken, Pa., mills.
Galvanized (No. 10), 6.75c, mill.
Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich.

Strip

Mot-kolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c, Sharon, Pa.; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.50c, Atlanta; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower respectively.

spectively.

Cold-Rolled Strip (0.25 carbon and less);
4.00c, mill, except 4.00-4.25c, Warren, O.;
4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich;
4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit;
4.50c, New Haven, Conn., West Leechburg.
New Castle, Pa., Boston; 4.75c, Dover, O.,
New Kensington, Pa.; 4.50-5.00c, Trenton, N.
J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los
Angeles; 7.10c, Fontana, Calif. One company
quotes 4.55c, Cleveland or Pittsburgh base,
and 4.75c, Worcester, Mass., base; another,
5.00c, Pittsburgh base.

Soloe, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton, N. J. Over 1.05 to 1.35 (10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton, N. J. Over 1.05 to 1.35 (10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton, N. J. Cold-Rolled Alloy Strip: 9.50c, mill except:

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4,95c, mill, except: 5.15c, Youngstown; 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating \$7.50-\$7.70; 1.50 lb coating \$7.75-7.95. Pittsburg, Calif., mill \$8.25 and \$8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, \$6.45-6.65; 0.50 lb tin, \$6.70-\$6.90; 0.75 lb tin, \$7.00-\$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight \$5.75-\$5.85. Pittsburg, Calif., mill, \$6.50.

Pittsburg, Calif., mill, \$6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point, Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, \$6.65, except: \$6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, \$15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.
Floor Plates: 4.55c, mill.
Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.
High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa., phillipse, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.40c, Youngstown; 5.65c, Ecorse, Mich., Sharon, Pa. Carbon Steel Plates: 3.40c, mill, except: 3.40-

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif., 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francico, Los Angeles; 5.75c, Fontana, Calif. Alloy Structural Shapes: 4.05c, mill. Steel Sheet Piling: 4.05c, mill. Steel Sheet Piling: 4.05c, mill. except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 5.15c, Youngstown.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa.; Minnequa, Colo., Atlanta, Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c. S. San Francisco; 5.40c, Shelton, Com., One producer

quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Paimer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif. Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Froducts to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.50c, mill, except: 4.90c, Sparrows Point, Md.; 4.95c, Monessen, Pa.; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo, Kokomo, Ind.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c, Crawfordsyille, Ind., freight equalized with Pittsburgh and Birmingham. ville, Ind., freig and Birmingham.

and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Allquippa, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.50c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburgh, S. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110, Minnequa, Colo, Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; §6.75c per 100 pound keg, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 13, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive):

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113, Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121, Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Ritmincham Birmingham.

Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126, Atlanta; 128, Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145. S. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo; \$123.50 per net ton, Williamsport, Pa.

Bale Tige (single loon): Column 106, mill. Column 106, mill.

Williamsport, Pa.
Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta: 113 Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh,

Stainless Steels

(Mill prices, cents per pound) CHROMIUM NICKEL STEELS

	Bars,		
Туре	Wire	Strip,	
No.	Shapes	Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
321	34.00-34.75	44.50-45.75	45.50-49.00
347	38.50-39.75	48.50-50.25	50.00-54.00

STAINLESS-CLAD STEELS

	Pi	ates	Sne	eets
	Clad	Cladding		ding
	10%	20%	10%	20%
302			19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50		
316	27.00	31.00	26.00	28.00
321	23.50	27.50		
347	25.00	29.00	24.00	26.00
405	18.75	24.75		
410	18.25	24.25		
430	18.25	24.25		

Tool Steels

Tool Steel: Cents per pound, producing plants; r arbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

					Base
W	Cr	V	Mo	Co	Per l
18	4	1			90.50
18	4	2			102.50
18	4	3			114.50
18	4	2		9 ,	168.50
1.5	4	-1	8.5	2 4 4	65.00
6.4	4.5	1.9	5 .		69.50
6	4	3	6 .		88.00

Tubular Goods

Standard Steef ripe: Mill prices in carlots, threaded and coupled, to consumers about \$200 a net ton. Butt Weld

\$200 a			t Wel	d		
In.	Bik.	Gal.	lin.		Blk.	Gal.
1/8	. 39 1/2-	81/2-	- 1.		46-	25-
		121/2			481/2	271/2
1/4	. 371/2-	9 1/2 -	- 1%		461/2-	251/2-
	391/2	14			49	28
3/8	. 34-	41/2-	- 11/	2	47-	26-
	36	9			491/2	28 1/2
1/2	. 40½-	- 18-	2.		471/2-	261/2-
	43	21 1/2			50	29
3/4	. 431/2-	- 22-	21/	2, 3	48-	
	46	24 1/2			501/2	29 1/2
				2 8 4.	44 1/2	
	Lap '					
	Blk.		Bik.			
2	39 1/2	171/2	38 1/2	161/2		
					381/2-	
21/2	421/2-		411/2	191/2	321/2-	
	431/2				$41\frac{1}{2}$	
3		201/2-	411/2	191/2	35-	13-
	43 1/2				411/2	
3 1/2 & 4		201/2-	43 1/2	$21\frac{1}{2}$	381/2-	
	46 1/2				43 1/2	
5 & 6	421/2-		43 1/2	211/2	381/2-	
	44 1/2				43 1/2	
	teel Pig	e: Mill				o con-

sumers	about	\$200 a	. net	ton.		
	Butt	Weld			Butt	Weld
In.	Blk.	Gal.	J.1	n.	BIK.	Gal.
1/2	401/2		1	1/4	46-	26-
3/4	35		1	1/2	48 46½-	261/2-
1/2						271/2
	42	18½- 19½	2		47-	26 1/2-
8/4	. 43-	221/6-			49	28
300	45	23 1/2	2	1/2 & 3	471/2-	27-
1	4516-	251/4-			491/2	281/6
	471/2	26 1/2	3	1/2 & 4	43½ Sean	
	Lap W	/eld	Elec.	. Weld	Sean	nless
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	381/2	161/2	371/2	15 1/2	26-	4-
					371/2	16
21/2	421/3	201/2	401/2	19 1/2	311/2-	
					4016	19
3	421/2	201/2	401/2	19 1/2	34-	12-
					40 1/2	19
31/2-4.	411/2-	20-	421/2	$20\frac{1}{2}$	371/2-	151/2-
	45 1/2	23 1/2			421/2	
5 & 6.	411/2-	20	421/2	201/2		
	43 1/2					
8	45 1/2		44 1/2	211/2-	401/2→	171/2-
					441/2	
10	45		44	21-	411/2-	181/2-
				21 1/2	44	211/2
12	44		43	20	401/2-	171/2-
					43	
Standa	mel 33/me	ought l	fron	Pine.	Will m	tice in

Standard Wrought Iron Pipe: Mill price in

about	\$200 a	net ton.			
	But	t Weld		Lap	Weld
In,	Blk.	Gal.	In.	Blk.	
3/8	+591/2	+951/2	114		
1/2	+201/2	-521/2	11/2	+151/2	-1451/2
3/4	-101/2	411/2	2	+ 71/2	+361/2
1 and	,	,	21/2-31	2+5	+32
11/4	+ 41/2	-1-321/2	4	List	+26
11/2		+29	41/2-8	+ 2	+27 1/2
2	2	+281/2	9-12.	-12	+37
Boiler	Tubes:	Net base	c.l. pr	ices, doll	ars per
100',	mill;	minimum	wall	thicknes	s. cut
		24", inclus			

O.D	B.V	V. ——Sea	mless	Elec.	Weld
In.	Ga.	H.R.	C.D.	H.R.	C.D.
1	13		13.39-14.64	13.00	13.00
11/4	13		15.87-17.34	13.21	15.39
1 1/2	13	16.45	17.71-19.35	14.60	17.18
1 3/4	13	18.71	20.15-22.02	16.60	19.54
2	13	20.96	22,56-24.66	18.60	21,89
21/4	13	23.36	25.16-27.50	20.73	24.40
21/4	12	23.54-25.73	27.70-30.28	22.83	26.88
21/2	12	25,79-28.19	30.33-33.15	25.02	29.41
2 3/4	12	27.33-29.87	32.14-35.13	26.51	31.18
3	12	28.68-31.35	33.76-36.90	27.82	32.74
31/4	11	33.39-36.50	39.29-42.95	32.39	38.11
3 1/2	11	35.85-39.19	42.20-46.13	34.78	40.94
4	10	44.51-48.65	52.35-57.22	43.17	50.78
4 1/2	9	58,99-64.47	69.42-75.88		
5	9	68.28-74.64	80.35-87.82		
6	7	104.82-114.57	123.33-134.81		

Pipe, Cast Iron: Class B, 6-in, and over, \$98.50 per net ton, Birmingham; \$106.70, del. Chicago; 4-in, pipe, \$5 higher; Class A pipe, \$5 a ton over Class B,

Rails, Supplies
Rails: Standard, over 60-lb; \$3.20 per 100 lb mill, except: \$3.50, Indiana Harbor, Ind., and Minnequa, Colo.
Light (billet): \$3.55 per 100 lb, mill, except: \$4.25. Minnequa, Colo.
Light (rail steel): \$5.10 per 100 lb, Williamsport Pa

port, Pa.

Railroad Supplies: Track bolts, treated: \$8.50 per 100 lb, mill. Untreated: \$8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif., 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes, 5.35c, mill, except: 5.25c, Pittsburgh, : ...

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron				
	gross T			
	Basic	No. 2 Foundry	Malleable	Besse- mer
Bethlehem, Pa., furnace		\$48.50	\$49.00	\$49.50
Newark, N. J., del	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del Philadelphia, del	50.3002	52.634 50.8002	53.134 51.3002	51.8002
Birmingham, furnace Cincinnati, del	42.88	43.38 49.43		
Buffalo, furnace	47.00 56.20	47.00 56.20	47.50 56.70	48.00
Rochester, del.	49.35	49.35	49.85	50.35
Syracuse, del	50.2065	50.2065	50.7065	41.2065
SChicago, district furnaces	46.00 46.	00-46.50	46.50	47.00
Milwaukee, del	47.82 47.		48.32	48.82
Muskegon, Mich., del	51.	28-51.78	51.78	* * * *
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del	48.3002	48.8002	48.8002	49.3002
Lone Star, Tex., furnace		†75.00	• • • •	
Duluth, furnace		46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace		52.75	53.25	
Geneva, Utah, furnace	46.00	46.50		
Seattle, Tacoma, Wash., del. Portland, Oreg., del		54.0578 54.0578		
Los Angeles, San Francisco	53.5578	54.0578		
Granite City. Ill., furnace	47.90	48.40	48.90	
St. Louis, del	49.40	49.90	50.40	
Ironton, Utah, furnace		46.50		
Ironton, Ctan, Turnace	• • • •	40.00	• • • •	
*Neville Island, Pa., furnace.	46.00	46.50 47.58	46.50 47.58	47.00
Pittsburgh, del., N.&S. Sides	47.08	*1.00	21.00	48.08
Pittsburgh (Carnegie), furnaces	46.00		• • • •	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	****	• • • •	* * * *
Swedeland, Pa., furnace	50.00	50.50	51.00	
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del	50.8230	51.3230		
Youngstown, O., furnace Mansfield, O., del	46.00 50.1022	46.50 50.6022	46.50 50.6022	47.00 51.1022

† Low phosphorus southern grade.

; To Neville Island base add; \$0.86 for McKees Rocks, Pa.; \$1.31 Lawrenceville, Homestead, McKeesport, Monaca; \$1.73 Verona; \$1.94 Brackenridge; \$1.08 for Ambridge and Allquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base).\$59.50 6.00-6.50 per cent SI (base),\$59.50 67.00 6.51-7.00. 60.75 9.01-9.50. 67.00 7.01-7.50. 62.00 9.51-10.00. 68.25 7.51-8.00. 63.25 10.01-10.50. 69.50 8.01-8.50. 64.50 10.51-11.00. 70.75 8.51-9.00. 65.75 11.01-11.50. 72.00 F.o.b. Jackson, O., per gross *n. Buffalo furnace \$1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus \$1 per gross ton. Electric Furnace Silvery Pig Iron Si 14.01-14.50%, \$84.75 furnace, Niagara Falls; \$84 open-hearth and \$85 foundry grade, Keokuk, Iowa. Pigleta, Si 16%, \$91, Keokuk, Iowa. Add \$1 a ton for each additional 0.5% Si to 18%; \$1 for each 0.5% Mn over 1%; \$1 a ton for 0.45% max. phos.

Charcoal Pig Iron

Low Phosphorus

Steelton, Pa., \$54; Buffalo, Troy, N. Y., \$50; Philadelphia, \$56.9786 delivered.

Intermediate phosphorus, Central furnace, Cleveland, \$51.

Electrodes

(Threaded,	with nip	ples,	unboxed)
Inche	3	Ce	nts per 1b,
Diam.	Length	f	.o.b. plant
	Graphit	е	
17, 18, 20		72	
8 to 16			16.50
7			17.75
8	48,	60	19.00
4, 5%	40		19.50
3	40		20.50
21/2			21.00
2	24,	30	23.00
	Carbon	1	
4.0	100,	110	7.50
35	100,		
30	84,	110	7.50
24	72 to	104	7.50
17 to 20	84,	90	7.50
14	60,	72	8.00
10, 12	60		8.25
8	60		8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF₂ content, 70% or more, \$37; less than 60%, \$34.

Metallurgical Coke

Price per Net Ton Beehive Ovens

Connellsville, furnace., \$13.50-15.50
Connellsville, foundry., 16.00-18.00
New River, foundry., 16.50
Wise county, foundry., 15.35
Wise county, furnace., 14.60 Oven Foundry Coke Kearney, N. J., ovens.
Everett, Mass., ovens.
Everett, Mass., ovens.
New England, del.
Chicago, ovens
Chicago, del.
Detroit, del.
Terre Haute, ovens \$22.00 23.35 20.40 24 16 Milwaukee, ovens ...
Indianapolis, ovens ...
Chicago, del.
Cincinnati, del. ... 21.15 Indianapolis, ovens
Chicago, del.
Clincinnati, del.
Detroit, del
Ironton, O., ovens
Cincinnati, del.
Painesville, O., ovens.
Buffalo, del.
Cleveland, del.
Erie, del.
Birmingham, ovens
Philadelphia, ovens
Swedeland, Pa., ovens.
Portsmouth, O., ovens.
Detroit, ovens 24.19 19.40 21.63 20.90 22.70 17.70 21.05 21.00 19.50 Detroit, ovens.

Detroit, del.

Buffalo, del.
Flint, del.
Pontiac, del.
Saginaw, del. *21.70

Includes representative switching charge of: *, \$1.05; †, \$1.45. ‡ Or within \$4.03 freight zone from

Coal Chemicals

Spot, cents per gallo	n, ovens
(Price effective as of	Aug. 5)
Pure benzol	20,00
Toluol, one degree	
Toluol, two degrees	23.00-26.50
Industrial xylol	
Per ton bulk, ov	ens
Sulphate of ammonia	
Per pound, ove	ens

(Effective as of Oct. 1) Phenol, 40 (carlots, returnable drums)
Do., less than carlots Do., less than carlots
Do., tank cars
(Effective as of Oct. 25)
Naphthalene flakes,
balls, bbl to jobbers,
"household use"

13.75

Refractories

(Prices per 1000 brick, f.o.b. plant) Fire Clay Brick

Fire Clay Brick

Super Duty: St. Louis, Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., \$100.

High-heat Duty: Salina, Pa., \$85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., \$80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Troup, Tex., Stevens Pottery, Ga., Fortsmouth, O., Ottawa, Ill., \$74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., Ottawa, Ill., \$66.

Ladle Brick

Dry Press: \$55. Freenort Meetly

Ladle Brick

Ladle Brick

ry Press: \$55. Freeport, Merill
Station, Clearfield, Pa.; Chester,
New Cumberland, W. Va.; Irondale, Wellsville, O.
//ric Cut: \$53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick t. Louis, Mo., Olive Hill, \$90; Beach Creek, Pa., \$80.

Silica Brick

Mt. Union, Claysburg, or Sproul,
Pa., Ensley, Ala., \$80; Hays, Pa.
\$85; Joliet or Rockdale, Ill., E.

Chicago, Ind., \$89; Lehi, Utah, Los Angeles, \$95. Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, \$80. Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chi-cago, Ind., Hays, Pa., \$81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Chrome brick or chemical-bonded chrome brick, \$69, magnesite brick, \$91, chemical-bonded mag-nesite, \$80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.) Domestic dead-burned, %" grains; Bulk, \$30.50-31.00; single paper bags, \$35.00-35.50.

Dolomite

(Base prices per net ton) Domestic, dead-burned bulk: Bill-meyer, Blue Bell, Williams, Plymouth Meeting, Pa., Miliville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., \$12.25; Thornton, McCook, Ill., \$12.35; Dolly Siding, Bonne Terre, Mo., \$12.45.

Ores

22,75

Lake Superior Iron Ore Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer		 \$7.60
Old range nonbessen	er	 7.45
Mesabi bessemer		7.35
Mesabi nonbessemer		7.20
High phosphorus		 7.20

Eastern Local Ore

Cents, units, del. E. Pa.
Foundry and basic 56.62%
concentrates, contract 16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports Swedish basic, 60 to 68% ... 15.00 Brazil iron ore, 68-69% ... 19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid\$26-\$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Nor-folk, Va., Mobile, Ala., New Or-leans, 67.60c-72.60c.

Chrome Ore

corone Ore

ross ton f.o.b. cars, New York,
Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland,
Oreg., and/or Tacoma, Wash.
(S S paying for discharge; dry
basis, subject to penalties if
guarantees are not met.)

Indian and African

48% 48%										
outh							-		990	

48% no	ratio	
D		

44% to 2.5:1 lump \$33.65

Rhodes	lan												
45%	no	ratio				٠	4		۰		\$ 27	7-\$27.50	
48%	no	ratio	۰	۰		۰	٠	۰		۰		30.00	
48%	3:1	lump			į		į		į	į.		39.00	

Domestic (seller's nearest rail)

48% 3:1\$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines \$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

							-BARS			PI	ATES-
	H-R 10 Ga.	—SHEETS- C-R 17 Ga.	Gal. *10 Ga.	ST	RIP——	H-R Rds. %" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon 3/4"-3/4"	Floor %" & Thicker
Boston (city) Boston (c'try) .	5.84 5.69	6.64 6.49	7.84 7.69	6.04 5.89	6.90 6.75	5.69 5.54	6.39 6.24	8.24-9.74 8.09-9.59	5.54 5.39	5,89 5.74	7.34 7.19
New York (city) 5. New York(c'try) 5.	73-5.80 53-5.60	6.73 6.53	7.74-7.83 7.54-7.63	6.08-6.28 5.88-6.08	• • •	5.73 5.53	6.58 6.38	8.67	5.52-5.78 5.32-5.58	5.98 5.78	7.48 7.28
Phila. (city) Phila. (c'try)	5.72 5.57	6.64 6.59	7.53-7.58 7.38-7.43	5.60 5.45		5.55 5.40	6.34 6.19	8.40 8.25	5.25 5.10	5.53 5.38	6.74 6.59
Balt. (city) Balt. (c'try)	5.46† 5.31†	6.36 6.21	7.26 7.11	5.52 5.37	• • •	5.57 45.42	6.31 6.16		5.51 5.36	5.71 5.56	7.16 7.01
Norfolk, Va	5.80					6.05	7.05		6.05	6.05	7.55
Wash. (w'hse). 5.	84-6.00			5.90		5.91-5.95	6.61		5.85-5.89	6.05-6.09	7.50-7.54
Buffalo (del.) Buffalo (w'hse)	5.00 4.85	5.90 5.75	7.85 7.70	5.49 5.34	6.50 6.35	5.20 5.05	6.05 5.90	10.13 9.98	5.25 5.10	5.50 5.35	7.06 6.91
Pitts. (w'hse) 4.	85-5.00§	5.75-5.858	7.15-7.70	5.00-5.35	5.95-6.00	4.90-5.10	5,65	7.65	4.90-5.15	5.05-5.25	6.55
Detroit (w'hse), 4.	85-5.00§	5.75-5.858	7.15	5.00-5.35	5.95-6.00	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.) 5. Cleve. (w'hse). 4.		5.90-6.31 5.75-6.16	7.35-8.10‡‡ 7.20-7.95	5.18-5.31 5.03-5.16	6.60-6.85 6.70	5.32-5.36 5.17-5.21	6.05-6.12 5.90-5.97	8.24-8.56 8.24-8.41	5.35-5.62 5.21-5.47	5.52-5.56 5.37-5.41	6.95-7.01 6.80-6.86
Cincin. (w'hse).	5.29	6.14	7.63	5.55	6.10	5.55	6.10		5.40	5.64	6.94
Chicago (city). Chicago (w'hse)4.8	5.20 5-5.05	5.90‡8 5.75‡8	7.30 7.15	5.00 4.85	6.67-6.80 6.52-6.65	5.05 4.90	5.85 5.70	8.25° 8.10°	5.05 4.90	5.25 5.10	6.70 6.55
Milwaukee (city)	5.38	6.08‡8	7.48	5.18	6.82-6.98	5,23	6.03	8.439	5,23	5.43	6.88
St. Louis (del.) St. L. (w'hse).	5.34§ 5.19§	6.24 ⁸ 6.09 ⁸	7.44 7.29	5.34 5.19	6.64 6.49	5.39 5.24	6.19 ¹² 6.04 ¹³	6.64 9.49	5.39 5.24	5.59 5.44	7.04 6.89
Birm'ham (city) Birm'ham(c'try)	5.20§ 5.05§	* * *	6.60 6.45	5,20 5,05		5.15 5.00	6.66-6.83 6.51-6.68		5.15 5.00	5.40 5.25	7.41-7.73 ²⁰ 7.26-7.58 ²⁰
Omaha, Nebr	6.07		9.33	6.07	***	6.12	6.92		6.12	6.32	7.77
Los Ang. (city) L. A. (w'hse)	6.55§ 6.40§	8.05 7.90	8.20† 8.05†	6,75 6.60	9.50 9.35	6.20 6.05	8.00-8.50 7.85-8.35	***	6.70 6.55	6.40 6.25	8.15 8.00
San Francisco .	5.9524	- 7.15	8.05	6,7521	8.2518	5.9021	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma .	6.3517	7.905	8.40	6.7017		6.2017	8.151	9.452	6.3041	6.3517	8.4017

Base Quantities: 400 to 1999 lb except as noted; Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; 1—1500 lb and over; 2—1000 to 4999 lb; 3—456 to 39,999 lb; 4—400 to 14,999 lb; 4—400 to 14,999 lb; 4—400 to 14,999 lb; 4—400 to 1499 lb; 4—400 to 1999 lb; 11—1500 lb and over; 14—2000 lb and over; 14—2000 lb and over; 15—1500 to 39,999 lb; 15—1500 to 39,999 lb; 15—1500 lb and over; 15—2000 lb and over; 15—2000 lb and over; 15—300 lb; 15—1500 to 39,999 lb; 15—1500 lb; 15—15

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ‡ 18 gage and heavier; • as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

1/2-in. and smaller; up to 6 in. in length.	35 off
Pand % x 6-in. and shorter	37 off
%-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in	35 off

Stove Bolts

in packages, nuts separate, $58\frac{1}{2}$ -10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

	A.S	3. f.o.b.
	A.S. R	eg. and
Semifinished hexagon	Light	Heavy
7g-in. and smaller	41 off	
7-in. and smaller		38 off
½-in1-in	39 off	
0 -in1-in.		37 off
1%-in1%-in	37 off	35 off
1%-in. and larger	34 off	28 off
Additional discount of 15 for	full conta	ainers.

Hexagon Cap Screws (Packaged)	
Upset 1-in, smaller by 6-in, and shorter (1020 bright) Upset (1035 heat treated)	46 off
% and smaller x 6 and shorter %, %, & 1 x 6-in, and shorter	40 off 35 off
Square Head Set Screws	
Upset 1-in. and smaller	51 off 31 off

Rivets

	F.o.b.	midwestern	plants	
Structural	1/4-1n.	and larger .		6.75c
Jin. and	unde	F		48 011

Washers, Wrought

F.o.b. shipping point, to jobbers. . Net to \$1 off

FERROALLOY PRODUCT PRICES

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton. \$62, Palmerton, Pa.; \$66, Pitts-burgh and Chicago; (16% to 19% Mn) \$1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk \$160 per gross ton of alloy, c.l., packed, \$172; gross ton lots, packed, \$187; less gross ton lots, packed, \$204; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price; \$165, Rockwood, Tenn.; \$162, f.o.b. Birmingham and Johnstown, Pa., furnaces; \$160, Sheridan, Pa.; \$163, Aetna, Pa. Shipment from Pacific Coast warehouses by one seller add \$31 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, \$201; less gross ton lots, \$218 f.o.b. Chicago. Add or subtract \$2 for each 1%, or fraction thereof, of contained manganese over \$2% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Sl. Special Grade: (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound. F.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Sl, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Sl 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5e per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 26.0c, Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.5c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c, Carbonad packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, \$1.03 per lb of contained chromium, ton lot \$1.05, less ton \$1.07. Delivered. Spot, add 50.

(Please turn to Page 174)

Metal Quotations Remain Firm

Major nonferrous metal markets are supported by demand which continues to exceed available supply. Several brass mills curtail operations

New York — Major nonferrous metal prices remain stabilized at levels established in mid-November. The markets are supported by demand which is in excess of available supplies, although it is not as pressing as it was a year ago. At the same time, the government continues to take substantial tonnages and stands ready to acquire all tonnages above those not taken by industry.

Copper -- Inquiries from consumers for delivery of copper in February and March have not been fully satisfied due to limited supplies which have been substantially reduced since October by a strike at the Utah producing properties. However, several important brass mills have cut operations recently due to a decline in new business. Consumption of copper by fabricators declined to 101,716 tons in December from 108.266 tons in November, making the 1948 total 1,-394,307 tons against 1,338,383 tons in 1947. Fabricators' stocks of refined copper increased to 379,346 tons at end of 1948 and compared with 423,432 tons at the end of 1947 while their total stocks of copper and purchases totaled 165,109 tons as of Dec. 31 compared with 149 092 tons a amonth earlier and 233.338 tons at the end of 1947. With unfilled orders totaling 316.169 tons against 298.838 tons as of Nov. 30, the deficit of stocks available for sale amounted to 151,060 tons, the largest deficit reported since September, 1947.

Lead—Domestic production of refined lead increased 5286 tons in December to 52,315 tons, while shipments to domestic consumers increased 5567 tons to 45,856 tons, resulting in an increase of 6455 tons in stocks to a total of 40.647 tons. Total production for 1948 came to 545,269 tons compared with 583.716 tons, while shipments totaled 525.899 tons against 608,421 tons in 1947. A breakdown of shipments for 1948 shows that cable makers received 114.253 tons against 120.098 tons in 1947, while battery makers received 97.637 tons against 98,350 tons.

Zinc — Undertone of the slab zinc market remains strong with demand well in excess of supply. Prime western holds at 17.50c, East St. Louis.

Tin — Combined Tin Committee has awarded interim allocations of 2685 tons of pig tin for the first half of 1949 to countries which were not included in carlier allocations. Amount allocated so far for 1949 totals \$2,055 tons compared with 39.566 tons allocateed in the first half of 1948 and 43,590 tons in the second half of last year. New allocations include \$00 tons to Poland, 675 tons to Czechoslovakia, 515 tons to Brazil, 225 tons to Hungary.

Aluminum—Production of primary aluminum increased about 100 million pounds in 1948 to 1,244,358,193 pounds, or about 9 per cent over the 1947 production of 1,143,500,000

pounds, according to Donald M. White, secretary, Aluminum Association. Shipments of aluminum sheet, plate, and strip by members of the association totaled 93,031,446 pounds during December, bringing the year's total to 1,250,469,806 pounds.

Heavy Lead Demand Seen

Secretary of Lead Industries Association analyzes supplydemand outlook

Denver — Government's stockpile requirements for the year ending June 30 1950 will be at least 70,000 tons of lead, probably larger if the lead supply and demand picture permits, Robert L. Ziegfeld, secretary, Lead Industries Association, said in an address before the Colorado Mining Association last week.

He forecasts continued gradual increasing mine production providing the labor supply continues to improve and there is relative freedom from striks. "Also the huge supply of scrap that has been built up by the tremendous lead consumption of recent years particularly in storage batteries indicates large sec-

PLANS SKYSCRAPER

Pittsburgh — Aluminum Co. of America announced plans last week for construction of a 30-story office building here at an estimated cost of \$10 million. It will have an all-aluminum exterior, according to Thomas Jolly, vice president of the company. Construction will begin by about mid-1950. The building site is now occupied by the historic Nixon theater.

ondary production although perhaps not equaling the last two years," he said.

"There is every reason to expect imports to continue heavy... Producers have only small stocks of lead, so small that little or none can be drawn from them this year. Manufacturers' inventories of lead are low."

In reviewing the satisfactory record established by the industry in 1948, he pointed out that even without the 100.000 tons drawn from stocks in 1947, the industry supplied almost as much lead in 1948 as it did a year earlier.

Mr. Ziegfeld made the following comments on future lead consumption by the five principal users, which account for nearly three-quarters of all consumption, and the government which also is an important buyer:

which also is an important buyer: Storage Batteries: "To fill the empty pipe-lines and keep up with the large new car production . . , the battery industry has been running at record rates until about a month ago. However, there are now definite signs that pipe-lines are filled and dealers well stocked with batteries, although new car production probably will remain at high levels. Replacement batteries also will have to be supplied for several million more batteries than prewar."

Cable: "Demand for the cable industry does not seem yet to have been satisfied. Some substitutes for lead cable sheathing are being used, but I think largely to piece out cable makers' lead supplies. This industry apparently still has not entirely caught up on power and telephone system extensions delayed by the war although the pressure is not so great as it was a year ago."

Construction: "There appears definitely to have been some slackening in general (in industrial equipment) and some resistance to the high price of lead. In home construction, the price is leading to substitutes."

Petroleum: "Outlook for lead as an anti-knock ingredient in gasoline seems to indicate further increased usage... Manufacturers of tetraethyl lead are planning expanded production facilities, but no effect of this expansion probably will be felt before late this year."

Paints: "In paint... the outlook

Paints: "In paint . . . the outlook is not so bright. The price of lead has caused paint manufacturers to use as little lead as possible in their paints."

Government: "Plans for stockpiling and rearmament have an important bearing on lead ... 70.000 tons of lead are going into the military stockpile during the current fiscal year ... Lead does not go directly into military applications to the same extent as some other metals ... Should there be more lead available than we need here, there is always the possibility of ECA increasing its assistance in getting lead for European countries with the result that less imports would be available to us."

WAA To Sell Aluminum Plant

Washington — Sealed bids for the purchase or lease of a surplus, government-owned aluminum plant at Burlington, N. J., are being invited by War Assets Administration. Bids will be received at the Office of Real Property Disposal, Washington, until 2 p. m., Mar. 2.

Terms for outright sale are on an "as is" basis. Proposals to lease will be subject to the lessee's obligation of funds sufficient to re-equip the plant and rehabilitate it for aluminum pig or ingot production. The leasing terms contain a proviso, however, that no rentals shall accrue or be payable until such time as the rentals, if otherwise payable, shall equal the amount of authorized expenditures made by the lessee and approved by WAA.

The plant, operated during the war by the Aluminum Co. of America, is about 65 per cent intact. It was originally designed to produce 108 million pounds of aluminum and aluminum alloys per year. The plant provides more than 640.000 square feet of floor space. Its reported cost to the government was about \$16,700,000.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley: Lake, 23.62 ½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 19.50-22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.00-17.50c.

Zine: Prime western 17.50c, brass special 17.75c, intermediate 18.00c, East St. Louis; high grade 18.50c, delivered.

Lead: Common 21.30-21.35c, chemical and corroding 21.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloy (6-6 type) 24.50-25.50c; No. 12 foundry alloy (No. 2 grade) 24.00-24.50c; steel deoxidizing grades, notch bars, granulated or shot. Grade 1, 26.75-27.25c; grade 2, 25.00-25.50c; grade 3, 24.00-24.50c; grade 4, 23.00-23.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb. and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) \$1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, \$1.028; grade O, 99.65-99.79%, incl., \$1.024; 99.5-99.649% \$1.024, grade F, 98.98.999% \$1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York \$88-\$94 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, \$24.50 per lb contained Be,

Cadmium: "Regular" straight or flat for \$2 del.; special or patented shapes, \$2.10.

Cobalt: 97-98%, \$1.65 per lb for 550 lb (keg); \$1.67 per lb for 100 lb (case); \$1.72 per lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Platinum: \$88-\$91 per ounce.

Silver: Open market, New York, 70.000 per ounce.

Palladium: \$24 per troy ounce. fridium: \$110-\$115 per troy ounce. Titanium (sponge form): \$5 per pound.

Rolled, Drawn, Extruded Products COPPER AND BRASS

(Base prices, cents per pound, Lo.b. mill) Sheet: Copper 37.18; yellow brass 34.59; commercial bronze, 95%, 37.23; 90%, 36.83; red brass, 85%, 36.01; 80%, 35.66; best quality, 35.33; nickel silver, 18%, 46.92; phosphorbronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.28; cold drawn 34.28; yellow brass, free cutting, 38.16; commercial bronze, 95% 36.92; 90% 36.57; red brass, 85% 35.70; 80% 35.35.

Seamless Tubing: Copper 37.22; yellow brass 37.60; commercial bronze 90% 39.54; red brass 85% 38.92; 80% 38.57.

Wire: Yellow brass 34.88; commercial bronze, 95% 37.52; 90% 37.17; red brass, 85% 36.30; 80% 35.95; best quality brass 35.62.

Copper Wire: Bare, soft, f.o.b, eastern mills, c.l. 29.42%c, l.c.l. 29.92%-30.05c; weather-proof, f.o.b, eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.55c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-4.25c.

Sheets and Circles: 2S and 3S mill finish c.l.

				COLLEGA	
Thickness	Widths or	Flat	Coiled	Sheet	
Range,	Diameters.	Sheet	Sheet	Circlet	
Inches	In., Incl.	Base*	Base	Base	
0.249-0.136	12-48	26.9			
0.135-0.096	12-48	27.4			
0.095-0.077	12-48	27.9	26.0	29.6	
0.076-0.068	12-48	28,5	26.2	29.8	
0.067-0.061	12-48	28.5	26.2	29.8	
0.060-0.048	12-48	28.7	26.4	30.1	
0.047-0.038	12-48	29.1	26.6	30.4	
0.037-0.030	12-48	29.5	27.0	30.9	
0.029-0.024	12-48	29.9	27.3	31.3	
0.023-0.019	12-36	30,5	27.7	31.8	
0.018-0.017	12-36	31.1	28.3	32.6	
0.016-0.015	12-36	31.8	28.9	33.5	
0.014	12-24	32.7	29.7	34.6	
0.013-0.012	12-24	33.6	30.4	35.5	
0.011	12-24	34.6	31.3	36.7	
0.010-0.0095	12-24	35.6	32,3	38.0	
0.009-0.0085	12-20	36.8	33.4	39.5	
0.008-0.0075	12-20	38.1	34.6	41.1	
0.007	12-18	39.5	35.9	42.9	
0.006	12-18	41.0	37.2	47.0	

[•] Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw	Machine				
Diam.		-Round		Hex	agonal
or dist		R317-T			
across	flats	178-T4	R3	17-T4	17S-T4
0.12		48.0			0-0-1
0.15	8-0.203	41.0			
0.219	9-0.313	38.0			
0.34	4	37.0			47.0
0.37	5	36.5		45.5	44.0
0.40	6	36.5			
0.43	8	36.5		45.5	44.0
0.469	9	36.5			
0.50	0	36.5		45.5	44.9
0.53	1	36.5			
0.56	3	36.5			41.5
0.59	4	36.5			
0.62	5	36.5		43.0	41.5
0.65	6	36.5			
0.68	8	36.5		p-0 4	41.5
0,75	0-1_000	35.5		40.5	39.0
1,06	3	35.5			37.5
1.12	5-1.500	34.5		39.0	37.5
1.56	3	34.5		***	37.5
1.62	5	33.5		** * *	36.5
1.68	8-2.000	33.5		470 4	
2.12	5-2.500	32.5		0.00	***
2.62	5-3.375	31.5			0.00

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburch) Sheets: Full rolls, 140 sq ft or more, \$27.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft. Pipe: Full coils, \$27.25 per cwt; cut coils, \$27.50. Traps and Bends: List price plus 70%.

Sheets, 22.00-22.50c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 20.75-21.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 18.75-20.50cg over 12-in., 20.75-21.50c.

(Base prices, f.o.b, mill) Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

(Base prices, f.o.b. mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks,

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

DAILY PRICE RECORD

							An-		
		Copper	Lead	Zine	Tin	Aluminum		Nickel	Silver
Jan	Avg.	 23.50	21.325	17.50	103.00	17.00	38.50	40.00	70.00
	Avg.		21.325	17.50	103.00	17.00	38.50	40.00	70.00
	Avg.	23.50	21.325	16.580	103.00	17.00	38.50	40.00	73.655
	3-31 .	23.50	21.30-21.35	17.50	103.00	17.00	38.50	40.00	70.00
	1.3		21 30-21 35	17.50	103.00	17.00	38.50	40.00	70.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Stratts, del. New York; Aluminum, primary ingots, 99%, del., Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials
Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; east, 30.12c.
Copper Oyanide: 70-71% Cu, 100-lb drums, 46.00c, f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-02 ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19.900 lb, 15.00c, f.o.b. Niagara Falls, N. Y.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; 10c.b. Cleveland. Add 1 cent for rolled depolarized.

polarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 3 or more kegs.

Tin Anodes: Bar, 1000 fb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Stannous Sulphate: Less than 2000 lb in 100 Stannous Suphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J. Stannous Chioride (anhydrous): In 400 lb bbl, 97.00c; in 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES
Prices in cents per pound for less than 15,000
lb f.o.b, shipping point,
Clean Rod Clean

	Heavy	Ends T	urnings
Copper	21.125	21.125	20.375
Yellow brass	18.875	18.625	18,125
Commercial Bronze			
95%	20.250	20,000	19.500
90%	20.125	19.875	19_375
Red brass			
85%	20.000	19.750	19.250
80%	19.875	19.625	19.125
Best Quality (71-79%)	19.750	19.500	19.000
Muntz Metal	18.250	18.000	17.500
Nickel, silver, 10%	20.250	20.000	10,000
Phos. bronze, A	22,625	22.375	21,375
Naval brass	18.750	18.500	18,000
Manganese bronze	18.750	18,500	17.875

BRASS INGOT MAKERS
BUYING PRICES
(Cents per pound, f.o.b. shipping point, carload lots)
No. 1 copper 19.50-20.00, No. 2 copper 18.50-19.00, light copper 17.50-18.00, composition red brass 15.00-15.50, auto radiators 13.25-13.75, heavy yellow brass 12.00-12.25.

REFINERS' BUYING PRICES
(Cents per pound, delivered refinery,
carload lots)
No. 1 copper 20.50, No. 2 copper 19.50, light
copper 18.50, refinery brass (80% copper), per
dry copper content 18.00-18.50.

copper 18.50, refinery brass (60% copper), per dry copper content 18.00-18.50.

DEALERS' BUYING PRICES (Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 18.50-19.00, No. 2 17.50-18.00, light copper 16.50-17.00, No. 1 composition red brass 14.25-14.50, No. 1 composition turnings 13.50-13.75, mixed brass turnings 8.75-9.00, new brass clippings 15.75-16.25, No. 1 brass rod turnings 12.75-13.25, light brass 8.25-8.50, heavy yellow brass 10.50-10.75, new brass rod ends 13.25-13.75, auto radiators, unsweated 12.75-13.00, cocks and faucets 12.25-12.50, brass pipe 12.75-13.25.

Lead: Heavy 18.50-19.00, battery plates 11.00-15.00, linotype and stereotype 19.50-20.00, electrotype 18.50-19.00, mixed babbit 19.50-20.00, solder joints, 23.00-24.00.

Zine: Old zine 9.50-10.00, new die cast scrap 9.50-10.00, old die cast scrap 6.00-6.50.

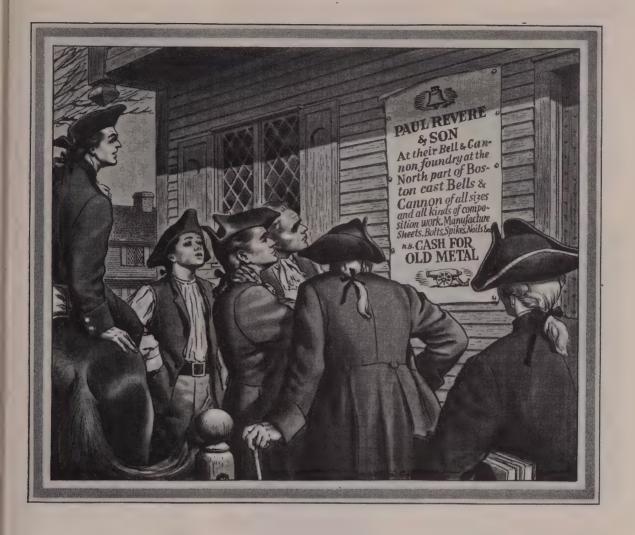
Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbit 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 28 15.50-16.00, old shears 12.00-12.50, crankease 12.00-12.50, brass and

tops 50.00-52.00.
Aluminum: Clippings 28 15.50-16.00, old sheets 12.00-12.50, crankcase 12.00-12.50, borings and turnings 6.00-6.50, pistons, free of struts,

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars	per gross ton, including broker's com	mission, delivered at consumer's plant	except where noted.
PITTSBURGH No. 1 Hyy. Meit \$41.00 No. 2 Hyy. Meit 39.00 No. 1 Busheling 41.00 No. 1 Bundles 41.00 No. 2 Bundles 38.00-39.00 No. 3 Bundles 37.00-38.00 Machine Shop Turnings 33.50-35.50	Nos. 1 & 2 Bundles	No. 1 Busheling	Cut Structurals 40.00 Cast Iron Grades No. 1 Cupola Cast 48.00-50.00* Stove Plate 42.00-43.00* No. 1 Wheels 59.00-61.00 Railroad Scrap
Machine Shop Turnings 33.50-35.50 Mixed Borings, Turnings 33.50-35.50 Short Shovei Turnings 35.00-35.50 Cast Iron Borings 34.50-35.50† Bar Crops and Plate 45.00-46.00 Heavy Turnings 35.50-37.50 Cast Iron Grades†	No. 1 Cupola Cast 50.00 Charging Box Cast 43.00 Heavy Breakable Cast 42.00 Stove Plate 42.00 Unstripped Motor Blocks 40.00 Brake Shoes 41.00 Clean Auto Cast 50.00 Drop Broken Cast 54.00	Cast Iron Grades No. 1 Cupola Cast	No. 1 R.R. Heavy Melt. 38.00 R.R. Malleable
No. 1 Cupola 54.00-56.00 Machinery Cast 63.00-66.00	Railroad Scrap	(F.o.b. shipping point)	
Charging Box Cast 50.00-51.00 Heavy Breakable Cast. 49.00-50.00 Malleable	No. 1 R.R. Heavy Melt. 38,00 R.R. Malleable 62,00 Rails, Rerolling 52.00 Rails, Random Lengths 46,00 Rails, 18 in. and under 54,00	No. 1 Heavy Melt. Steel \$35.00 No. 2 Heavy Melt. Steel 31.90 No. 1 Bundles 31.90 No. 1 Busheling 31.90 Machine Shop Turnings 27.00-28.00	SAN FRANCISCO No. 1 Heavy Melt. Steel *\$27.50 No. 2 Heavy Melt. Steel No. 1 Busheling 27.50 Nos. 1 & 2 Bundles 27.50 27.50 No. 3 Bundles 24.50
No. 1 R.R. Heavy Melt. 44.00 Axles	(Brokers' buying prices, f.o.b. shipping point)	Mixed Borings, Turnings 27.00-28.00 Short Shovel Turnings 29.00-30.00 Bar Crops and Plate 37.50-38.50 Punching & Plate Serap 37.50-38.50 36.00-37.00	Machine Shop Turnings Bar Crops and Plate. 27.50 Cast Steel 27.50 Alloy Free Turnings. 18.00 Cut Structurals 27.50
Rails, 3 ft and under. 55.00-56.00 Rails, 18 in. and under 56.00-57.00 Railroad Specialties 54.00-55.50 Uncut Tires 54.00-55.00 Angles, Splice Bars 56.00-57.00	No. 1 Heavy Melt. Steel \$32.50-33.00 No. 1 Busheling	Cast Iron Grades No. 1 Cupola Cast 55.00-56.00 Heavy Breakable Cast 49.00-50.00 Stove Plate 48.00-49.00 Unstripped Motor Blocks 46.00-48.00	Cast Iron Grades No. 1 Cupola Cast 50.00-65.00 Railroad Scrap
† Nominal. CLEVELAND	Mixed Borings, Turnings 26.50-27.00 Short Shovel Turnings. 27.50-28.00 Cast Iron Borings	Clean Auto Cast 50.00-52.00 CHICAGO	No. 1 Heavy Melting. •28.50 Axles
No. 1 Heavy Melt. Steel \$37.00-37.50	Cast Iron Grades	No. 1 Heavy Melt. Steel \$37.00	*F.o.b. California shipping point.
No. 2 Heavy Melt. Steel 37.00-37.50 No. 1 Busheling 37.00-37.50	No. 1 Cupola Cast 53,00-55,00	No. 2 Heavy Melt. Steel 35.00-37.00 No. 1 Bundles 37.00	SEATTLE
Nos. 1 & 2 Bundles 37,00-37,50 Machine Shop Turnings 31,50-32,00 Mixed Borings, Turnings 33,50-34,00 Short Shovel Turnings 33,50-34,00 Cast Iron Borings 32,50-33,00 Bar Crops and Plate 43,00-44,00 Punchings & Plate Scrap 43,00-44,00 Heavy Turnings 37,00-37,50 Alloy Free Turnings 33,50-34,00 Cut Structurals 43,50-44,00	Heavy Breakable Cast. 48.00-50.00 Clean Auto Cast 53.00-55.00 BUFFALO No. 1 Heavy Melt. Steel \$42.00-43.00 No. 2 Heavy Melt. Steel 38.00-38.50 No. 1 Busheling 38.00-38.50 Nos. 1 & 2 Bundles 38.00-33.50 Machine Shop Turnings 33.00-33.50	No. 2 Bundles	No. 1 Heavy Melt. Steel \$29.00-30.00 No. 2 Heavy Melt. Steel 29.00-30.00 No. 1 Busheling
Cast Iron Grades	Mixed Borings, Turnings 33.00-33.50 Cast Iron Borings 34.00-34.50	Cast Iron Grades No. 1 Cupola Cast 45.00-50.00	No. 1 Cupola Cast 45.00
No. 1 Cupola \$60.00-61.00 Charging Box Cast 57.00-57.50 Stove Plate 57.00-57.50 Heavy Breakable Cast. 50.00-50.50 Unstripped Motor Blocks 50.00-50.50	Short Shovel Turnings. 34.00-34.50 Low Phos	Clean Auto Cast	Heavy Breakable Cast 35.00 Stove Plate 30.00 Unstripped Motor Blocks 32.50 Malleable 40.00 Brake Shoes 35.00 Clean Auto Cast 40.00
Maileable 70.00-70.50 Brake Shoes 53.00-53.50 Clean Auto Cast 63.00-63.50 No. 1 Wheels 60.00-60.50 Burnt Cast 52.00-52.50	Mixed Cupola 48.00-50.00 Heavy Breakable Cast. 55.00-57.00 Malleable 70.00-75.00 Clean Auto Cast 65.00-66.00 Railroad Scrap	Malleable 59.00-60.00 Rails, Rerolling 50.00-52.00 Rails, Random Lengths 39.00-40.00* Rails, 3 ft. and under 45.00-46.00* Rails, 18 in. and under 48.00-49.00* Railroad Specialties 44.00-45.00	No. 1 Wheels
No. I. R.R. Heavy Melt 43.00-44.00 R.R. Malleable 72.00-73.00 Ralls, Rerolling 60.00-66.00	Rails, 3 ft. and under. 56.00-57.00 Railroad Specialties 54.00-55.00	Angles, Splice Bars 49.00-51.00 * Nominal.	Angles and Splice Bars 28.50 LOS ANGELES
Rails, Random Lengths 56.00-58.00	PHILADELPHIA	ST, LOUIS	No. 1 Heavy Melt. Steel \$27.50 No. 2 Heavy Melt. Steel 27.50
Rails, 3 ft and under. 60.00-62.00 Cast Steel 51.00-52.00 Railroad Specialties 52.00-53.00 Uncut Tires 50.00-52.00 Angles, Splice Bars 58.00-59.00	No. 1 Heavy Melt. Steel \$40.00-40.50 No. 2 Heavy Melt. Steel 37.50-38.00 No. 1 Busheling 37.50-38.00 Nos. 1 & 2 Bundles 37.50-38.00 No. 3 Bundles nom.	No. 1 Heavy Melt, Steel \$38.00-39.00 No. 2 Heavy Melt, Steel 37.00-38.00 Machine Shop Turnings 25.00-26.00 Short Shovel Turnings, 26.00-27.00	Nos, 1 & 2 Bundles 27.50 Machine Shop Turnings 20.00 Mixed Borings, Turnings 15.50-16.00 Punchings & Plate Scrap 33.00-36.00
WAY YOU	Machine Shop Turnings 31,00-32,00 Mixed Borings, Turnings 31,00-32,00 Short Shovel Turnings. 34,50-35,50	Cast Iron Grades No. 1 Cupola Cast 49.00-51.00	Cast Iron Grades No. 1 Cupola Cast \$37.50-42.50
VALLEY No. 1 Heavy Melt. Steel \$37.50-38.00 No. 2 Heavy Melt. Steel 37.50-38.00 No. 1 Bundles 37.50-38.00	Bar Crop and Plate 42.00-43.00 Punchings & Plate Scrap 42.00-43.00 Cut Structurals 42.00-43.00 Elec. Furnace Bundles. 41.00-42.00	Mixed Cast 47.00-49.00 Heavy Breakable Cast 42.00-43.00 Brake Shoes 44.00-45.00 Clean Auto Cast 50.00-52.00	HAMILTON, ONT. (Ceiling prices, delivered)
Machine Shop Turnings 32.00-32.50 Short Shovel Turnings 35.00-36.00 Cast Iron Borings 33.50-34.50 Low Phos 45.00-46.00	Heavy Turnings 39.00-40.00 No. 1 Chemical Borings . nom. Cast Iron Grades	Burnt Cast	Heavy Melt
Railroad Scrap No. 1 R.R. Heavy Melt, 43.00-44.00	No. 1 Cupola Cast 50.00 No. 1 Machinery Cast. 52.00 Charging Box Cast 44.00 Heavy Breakable Cast. 45.00 Unstripped Motor Blocks 47.50	Rails, Random Lengths 43.00-44.00 Rails, 3 ft. and under 50.00-52.00 Uncut Tires	Rails, Remelting 23.00 Rails, Rerolling 26.00 Bushelings 17.50 Bushelings, new factory, prep'd 21.00
MANSFIELD	Clean Auto Cast 50.00 No. 1 Wheels 52.00-53.00	DIDMINGUAM	Bushelings, new factory, unprep'd
Machine Shop Turnings \$35.50-36.00	Malleable nom.	BIRMINGHAM No. 1 Heavy Melt, Steel \$35.00	Short Steel Turnings 17.00
Short Shovel Turnings 37.50-38.00	NEW YORK	No. 2 Heavy Melt. Steel 35.00 No. 1 Busheling 35.00	Cast Iron Grades* No. 1 Cast
CINCINNATI	(Brokers' buying prices f.o.b. shipping point)	Nos. 1 & 2 Bundles 35.00 No. 3 Bundles 32.00 Long Turnings 30.00 32.00	No. 2 Cast 44.00
	No. 1 Heavy Melt. Steel \$36.00-36.50 No. 2 Heavy Melt. Steel 34.00	Long Turnings 30.00-32.00 Short Shovel Turnings 30.00-31.00 Cast Iron Borings 28.50	*Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



". . . CASH FOR OLD METAL". Paul Revere

In a public announcement of the establishment of his new foundry in 1792, Paul Revere advertised for old metal. He needed scrap to supplement his limited supply of ores. This same situation has existed throughout the growth of American industry. Today that need is increasingly important.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

Main Office LINCOLN-LIBERTY BLDG. Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA. DETROIT (ECORSE), MICH. MODENA, PA. • PITTSBURGH, PA.



BIRMINGHAM, ALA. Empire Bldg. BOSTON, MASS. Statler Bldg. BUFFALO, N. Y. Genesee Bidg.

CHICAGO, ILL. 100 W. Monroe St CLEVELAND, O. 1022 Midland Bldg. DETROIT, MICH. 2011 Book Bldg.

ST. LOUIS, MO. 2110 Railway Exchange Bldg.

Branch Offices

LEBANON, PA. Luria Bldg. NEW YORK, N. Y. Woolworth Bldg.

HOUSTON, TEXAS PITTSBURGH, PA.
Cotton Exchange Oliver Bldg. PUEBLO, COLO. Colorado Bldg. READING, PA. Luria Bldg.

SAN FRANCISCO, CAL. Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

159 February 7, 1949

Sheets Strip . . .

Demand pressure varies; appreciable easing has come in specialties only

Sheet Prices, Page 152

Boston — Volume of orders for cold-rolled carbon and alloy strip is lower; producers are booking for second quarter with backlogs somewhat lower, but subject to revised schedules because of lack of balance in hotrolled. Shoe shank steel buying is slower while in alloys demand for chain-making has declined. There are scattered cancellations and cutbacks in flat-rolled but in sheets (sili-

con and stainless excepted) demand is still in excess of supply, notably galvanized. Scheduling for second quarter has not gone beyond April in most cases. New York — Carbon sheet consum-

ers continue to exert heavy pressure on the mills. Some buyers are in less urgent need of steel, but others are still not getting all they want. Actually, it is only in some of the specialties that the mills note any appreciable decline in demand. This is true in silicon sheets and in stainless sheets, although some sellers of the latter point out that the controlled missile program of the government is taking a steadily increasing tonnage. Sellers of car-bon sheets have not opened books for shipment beyond April and the

majority haven't opened beyond March

Philadelphia - One leading independent sheet mill expects to have first-quarter consumer quotas set up within a week. Indications are that allotment will be about on the current basis. Despite some cancellation of conversion deals and the fact that gray market tonnage is more plentiful at lower premiums, plate producers are still confronted with far more tonnage than they can han-

Chicago - Second quarter outlook for sheets and strip is changed very little from first quarter in spite of cutbacks in some consuming lines. The quota cuts which most made in first quarter generally continue in force, voluntary allocation requirements acting against rein-statements. Continued tightness in mill steel also precludes abandonment of conversion arrangements by many of the larger participants and quotas for this material at least at one local mill were filled minutes after the books were opened. Some interests which have been trying to book conversion time, however, are toying with the idea of buying broker steel, since its price, according to some is now close to that of converted material. Offers have been made of hot-rolled sheets for 7.00c a pound. Lower requirements of manufacturers of small electric motors have made silicon sheets more plentiful; however, the same condition in household appliance fields has not noticeably affected the supply of enameling sheets.

Cincinnati - Sheet mills are receiving cutbacks, but the overall supply continues short of demand. Lighter requirements in some lines have made possible only minor expansion in shipments to other interests. Probably the most tangible result will be reduction of the first quarter carry-

Birmingham-Even with a moderate decline in demand for sheets. the district's supply remains considerably below demand. There is little prospect of a material change, since a large proportion of the tonnage produced locally is taken up in tin mill output.

Los Angeles - Although demand continues soft in some sectors, over-all requirements for flat-rolled producus suil is in excess of supply. Re-flecting the easing in pressure are increasing cancellations, one producer reporting that these have extended in several cases to light gage galvanized, which is one of the tightest categories in the western market and is expected to continue so for some time to come.

San Francisco - Overall demand has not been affected by tendency of some consumers to buy more cautious-All available supplies are quickly taken off market, and supplies are not noticeably increasing.

Rails, Cars . . .

Track Material Prices, Page 153

New York - Car business is slow, but inquiries are gradually accumulating with a result that business in February probably will exceed the limited volume for the preceding month. Rail buying includes 53,000 tons for the Atlantic Coast Line.



Wire . . .

J. & L. revises price schedule applicable to galvanized wire items

Wire Prices, Page 153

Pittsburgh — Sharp advance in zinc costs since late last year has forced wire producers to make a complete study of galvanizing weights with reference to gage of wire to be coated and coating weights. The galvanizing extras, applicable to the lower carbon grades of manufacturers wire, have not been adjusted by some producers since 1940 and are based on lower priced zinc. The industry generally has had one base price for low carbon bright manufacturers wire to which is added a size and a galvaning extra dependent on type of coating desired.

Jones & Laughlin Steel Corp., effective Jan. 26, advanced galvanized wire items about 15 to 20 cents per 100 pounds in most instances to reflect higher zinc costs, although increases up to 40 cents for heavier type 3 coatings also are noted. In the lighter coating group some sizes were reduced. Company also has adopted the policy of no longer selling the various grades of galvanized manufacturers' wire on the bright hard wire base price. A base price for each type of galvanizing has been established, as listed below to more accurately reflect the amount of zinc picked up in drawing operations, due to size, speed and type of coating. These types of galvanizing represent weight of coating as expressed in terms of ounces of zinc per square foot of wire surface.

In addition to establishment of the new price bases, which now include galvanizing extras, the company has put into effect a new size extra list for gage applicable to the various types of galvanizing. Pricing of high carbon and merchant quality wire has similarly been adjusted (See STEEL, Jan. 31, page 115).

This new pricing policy is a departure from that currently existing within the trade for galvanized wire items, and should result in a clearer understanding by the purchaser in figuring product cost because there is but one price for each type of galvanizing and one extra for gage.

Company's recently established base prices f.o.b. Aliquippa, Pa., in carlots, for manufacturers' wire are as follows:

Manufacturers' Wire

Low	-Carbon
Bright Hard Wire	\$4.15
Galvanized Wire:	
Regular	5.15
Type I	5.25
Type II	5.50
Type III	5.85
Redrawn	5.75
High	-Carbon
Spring Wire:	
Bright Mastercraft	5.20
Reg. Galv. Mastercraft	7.40
Bright M. B	5.55
Reg. Galv. M. B	7.75
Border & Brace Wire, Bright:	
8 Ga. & Lighter	5.20
Heavier than 8 Ga	5.55
Border & Brace Wire, Reg. Galv.;	
8 Ga. & Lighter	7.40
Heavier than 8 Ga	7.75

Boston — Cutbacks in wire volume are in some cases rather deep. Clock spring wire consumers are holding up

shipments and users generally are checking for balance in inventories. Most screw manufacturers are taking in first quarter allocations at unchanged levels, but there are a few exceptions. Wire mill backlogs, while still substantial, are not as extended, although sufficient to fill in spot openings. Rod supply has improved slightly enabling consumers with finishing capacity to strike better balance in sizes.

Chicago — With many wire consuming fields seasonally affected adversely, merchant product sales are slow. Farm demand is off, poultry netting and bale ties currently being in excess supply among distributors. Furniture and bed makers are reportedly not pressing for spring

wire. However, nails of all description are critically short notwithstanding decline in construction activity in the area.

Birmingham—Demand for all wire products is well sustained. A momentary drop of considerable proportions is noted in pressure for agricultural wire, due almost wholly to adverse weather conditions. A well-sustained demand for merchant wire also is in evidence, especially wire for bed springs.

San Francisco — Wire rope is readily available, and some other wire products are in more than ample supply. Weather conditions are believed to be a factor in recent market letdown and a seasonal pick-up is ex-

pected in the spring.



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Structural Shapes . .

Structural Shape Prices, Page 153

New York — Structural demand is a little livelier, including a fair amount of private work, although construction is still dominated by public projects. The largest award to be reported here last week involved 3200 tons for an apartment house, the second sizable apartment house to have been placed in the last fortnight. District fabricating shops have backlogs ranging from three to five months, but certain of the larger fabricators who compete here have backlogs which extend six to seven months.

Boston—Structural inquiry is featured by 1500 tons, private work in

Connecticut, including a textile mill building, New London. Bulk of estimating has been for public work and Rhode Island has bids on three bridges, taking several hundred tons. Inquiry for steel grid flooring is heavier with states asking direct bids more frequently. Maine is expected to again purchase bulk of small bridge requirements directly this year. Plain structural material continues in limited supply with district shops restricted to potential allocations in estimating work.

Pittsburgh — Structural fabricators continue to make headway against order backlogs. One large interest's backlogs now range from 6 to 9 months, depending on type of work, in contrast with 8 to 12 last

fall. Backlogs would be at much lower levels were it not for continued shortage of steel and drawings. Inquiries for industrial plant expansion programs are off materially while municipal requirements have declined seasonally and requirements for veterans' hospitals are substantially lower. New work is attracting many more bidders than was the case six months ago and there is developing a tendency to cut current profit margins on bidding new jobs in anticipation of lower costs. However most fabricators continue to protect themselves against rising costs by inclusion of escalator clause.

Philadelphia — Structural steel demand continues to be featured by public work, with 6000 tons for a state bridge over the Susquehanna river near Steelton, Pa., expected out for bidding late this month. Bids on the 14,000-ton state bridge on Penrose Ave. here are expected to be asked in March. Meanwhile, early action is expected on the award of around 37,000 tons of steel for the Delaware River memorial bridge near Wilmington, Del., on which the American Bridge Co., Pittsburgh, is low bidder.

Birmingham — Several relatively small structural steel contracts were reported last week, but their aggregate is not imposing. Construction, except for miscellaneous small projects, is virtually at a standstill because of adverse weather conditions.

Los Angeles — Projects being announced by public and private utilities are stimulating demand for structurals, which in recent months has been spotty. Fabricated penstocks, transmission towers, and considerable quantities of equipment will be required by the Owens Gorge power project of the Los Angeles Department of Power and Light, and a new San Joaquin river hydroelectric plant of the Southern California Edison Co.

San Francisco — Some structural shapes are in more plentiful supply, and supply and demand slowly are moving toward parity as result of

slackening in construction.

Seattle — Inquiry is slow with fabricating plants, but there is still a good volume of small jobs within inventory limits. Backlogs are fair, but deliveries have been delayed by unfavorable weather. Supply of standard shapes is larger; that of wide flange structurals, still tight.

Prices Ease in Gray Market

Cleveland — Offerings of steel in the gray market are being made at levels well below peaks, although still above present mill levels. For material located in Ohio, for instance, prices are quoted per 100 pounds at the following levels: Mild angles, \$7.75; hot-rolled rounds, \$5 to \$7.25; cold-finished rounds, \$6; 2-inch slabs, \$6; 12-gage, hot-rolled mild strip, commercial quality, \$5.50; 3/8-inch floor plate, \$7.50; hot-rolled flats, \$7.20. For material located in Michigan, the following offerings are reported: Cold-finished sheets, \$9.75; cold-finished rounds, \$6; cold-finished hexagen bars, \$5.25 (free cutting, \$7.10); hot-rolled flats, pickled and oiled, \$6.68; cold-finished strip, fully annealed, \$10.55; cold-finished flats, \$7.50.



Tubular Goods . . .

Tubular Goods Prices, Page 153

Pittsburgh-National Tube Co., effective Feb. 1, adopted new extras on stainless and welded steel tubing for quantities under 2500 feet or pounds. Company also reduced special analysis extras by 1 per cent and raised analysis deductions by 1 per cent on stainless seamless tubing. Based on current volume of orders, the revisions will result in no change in average proceeds to the company and should be to advantage of distributors. Quantity extras for stainless seamless and welded steel tubing, established by National Tube, are as

	-Per	Cent-
Ft or Lb	New	Old
Under 75	100	80
75 to 149	75	50
150 to 299	50	30
300 to 499	25	15
500 to 999	171/2	7 1/2
1000 to 2499	71/2	5

Sellers of oil well tubing, drill pipe and casing report softening in new order volume. However, pressure for line pipe shipments shows no signs of easing with producers booked into 1952 on large diameters.

Los Angeles - Demand for pipe far exceeds supplies, and probably will continue to do so for a long time A number of major and to come. countless minor pipeline projects are under way, and others are pending, while a vast potential of replacement buying is expected to come into the market when there is more hope of obtaining materials. Pipe suppliers in general have extremely low inventories, severely limited in size and Although oil field and refinery demand on the whole is as strong as ever, there is indication that heavy accumulations of crude oil, combined with present large proven reserves underground, may somewhat restrict the drilling and exploitation opera-tions of several petroleum companies.

San Francisco — Cast iron soil pipe supplies are ample, but scarcity of steel pipe and many other tubular products continues; with heavy demand sustained by needs of utilities and oil operators. Stainless steel tubing is moving slowly and inventories are rising.

Plates . . .

Plate Prices, Page 153

Philadelphia — Most plate producers remain behind on commitments, with a leading producer blanking out noncertified tonnage for March, and with little available for April. the other hand, certain mills are beginning to accept orders for second quarter on a somewhat freer basis, although their schedules haven't been definitely laid out. Several hundred tons of 1/4 to 1/2-inch plates from the Far West are being offered here at around 6c, delivered, which is actually well under the current price of one eastern Pennsylvania mill, which has long been quoting on a premium basis.

Boston — Plate fabricating shops' order backlogs are generally lower, but volume has not slackened to the extent demand for plates is easng. Tank and weldment shops, while booking less volume, are short of plates, notably in the extreme light and heavy gages. Shipbuilding requirements are heavier with specifications against certified tonnage more active. District railroad car building shop is operating below peak and bus volume

Birmingham Plates remain among the district's most stringent Demand is estimated at 30 per cent or more above curent supply. especially since virtually the entire output at Republic Steel Corp's Gadsden plant is being diverted to steel Warehouse stocks of plates are reported to be especially short.

New York — Notwithstanding a certain easing in some directions, it will still be some time before plate producers will be in a buyers' market. They anticipate little real change before the end of this half and some doubt if there will be any marked change in the volume of specifications even then.

The long-term outlook is less promising, but there remains plenty of work in prospect to more than absorb production for several months

Seattle - Plate fabricators report a large volume of potential work on which figures are being asked, indicating activity for the next six months. However, the continued shortage of materials is an immediate problem and has reduced operations to some extent. Fair backlogs in small tonnages are reported.



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Steel Bars . . .

Bar Prices, Page 152

New York — Demand for cold-drawn carbon bars and for alloy steels, paricularly of aircraft quality, is easing. Cold-drawn bar consumers report that they cannot get the mill shipments frequently desired, but are having somewhat better success and are now having little difficulty in getting what they want out of warehouses, if necessary. Sellers of cold-drawn bars, especially those with no mill affiliation, assert they could do far better in meeting demand were it not for continued shortage of hot carbon materials. Some contemplate a better supply of hot bars in the second quarter.

Boston — While demand for cold-drawn carbon bars has eased, finishing mills are pressing for hot-rolled tonnage with backlogs substantial in most cases. Defense programs are not supplying expected tonnage for alloys; delays in completion of engineering details account for part of this lag. With one exception producers of hot-rolled carbon bars are holding to quotas; among size ranges flats are in urgent demand.

Philadelphia—Most mills have taken no action in setting up quotas on hot carbon bars for second quarter shipment, although the time appears near at hand when allotments for at least the first month or so should be announced. A couple of mills have established quotas for April, but in one case only on certified tonnage. Cold-drawn carbon bar orders are being accepted freely for second quarter, except for a few sellers. Alloy bars are in fairly easy supply.

Chicago — A few customers will get a few more carbon bars next quarter. While not all mills have opened books and those that have report the tonnage is being snapped up, reductions in needs of scattered consumers reflecting inventory balancing and lower production requirements, spell a slightly easier situation. The easing is more noticeable in alloy, although this tonnage does not go begging long.

Los Angeles — Result of over-estimation of bar requirements by some smaller consumers is evidenced in a growing number of cancellations. Nevertheless, all bar tonnages that become available are promptly absorbed by other customers, even those offered on a package tonnage basis.

Seattle — Merchant bars are in strong demand, although bulk of mill production is reinforcing. Northwest Steel Rolling Mills Inc., Seattle, has resumed rolling of small angles under 2½ inches, for which there is a good market, most of the output going into warehouse inventories.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Boston — To meet strong demand for concrete reinforcing bars, allocations to distributors are restricted and lower for February in some instances. Inquiry includes substantial tonnages for small sizes. Housing accounts for bulk buying with contractors covering requirements with difficulty; this type of construction involves 2800



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Pig Iron . . .

Pig Iron Prices, Page 154

Pittsburgh — Jobbing foundries have reduced bid prices for new work about 10 to 15 per cent, with one cut reported as high as 50 per cent. This effort to obtain new business is expected to result in considerable reshuffling of patterns among local jobbing shops. New orders have recorded a slight improvement at the lower price levels and this trend in order volume is expected to continue as larger consumers start awarding contracts based on bids received in recent weeks.

Basic iron production is at highest level in months with only one out of 47 units down for relining. Carnegie-Illinois Steel Corp. blew in its No. 3 furnace at the Carrie Works, Jan. 31.

Merchant iron supply continues well below immediate needs despite influx of some foreign iron here and curtailed output among small jobbing foundries.

New York—Domestic pig iron sellers are having no trouble in disposing of their output and claim they could sell still more if they had it, notwithstanding the spotty situation that prevails among district foundies. The sharp decline in price and increase in supplies of cast scrap have not resulted in any appreciable drop in demand for iron, although pressure has eased. Interest in foreign pig iron, which is still being offered at a substantial premium over domestic iron, continues to lag, with little new tonnage being placed.

Roston — Contributing to suctained demand for pig iron despite lower foundry melt is a general increase in ratio of iron in mixtures, some having raised it to normal or 50 to 55 per cent. These same foundries until recently were using only 25 per cent iron. This increase in ratio of iron has sustained shipments and, while a few shops are pressing for tonnage less actively, output by the Everett furnace is being absorbed without material increase in reserves.

Philadelphia—District pig iron sellers continue to report more demand than they can handle, with some consumers still paying premiums on foreign iron where it is available for early shipment. One district foundry, for instance, has closed on a few hundred tons at around \$65 c.i.f., originally scheduled for shipment inland but later released for resale because of the high freight involved.

Buffalo — While leading merchant iron sellers have no trouble finding an outlet for 100 per cent production, an easier undertone was apparent in the market last week. A tapering off in melting operations was noted among malleable plants, who heretofore had resisted any recession. The situation, however, is not alarming as railroad and motor casters continue to grab any additional iron made available by curtailments in other lines. An increased volume of casting was moving to Michigan motor makers.

Cincinnati—Foundry iron is being shipped into this district from northern and southern furnaces near previously established volume. All is being quickly absorbed and considerably more could be placed, although furnace interests are shifting deliv-



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eries on cutbacks from a number of melters. No change in the general situation on iron supply and demand is expected until the price relation between iron and scrap is further altered.

Chicago — Filtering through the general pessimism foundrymen began to feel when their business fell off decidedly in the late months of last year are reports that some of the hardest hit companies are making a comeback. Enough time has now elapsed to dig up new contracts to partially replace those which were canceled. The curtailments which took place led one iron seller to believe it could abandon its monthly quotas and supply iron as orders were received. This idea was shortlived, however, when deferred tonnage was taken in and canceled orders were reinstated.

Chattanooga, Tenn. — Tennessee Products & Chemical Corp.'s Rockwood, Tenn., blast furnace is now producing pig iron, following a \$250,000 improvements and re-equipment program. Output is sold on a contract basis at prices which are not publicly reported at present. During the war, this furnace produced more than 350,000 tons of ferromanganese, valued at \$42 million. The company anticipates a monthly production of from 9000 to 10,000 tons.

Iron Ore . . .

Iron Ore Prices, Page 154

Cleveland — United States ranges accounted for 98.57 per cent of all Lake Superior iron ore shipped by lake last season, compared with 97.91 per cent in 1947, according to the Lake Superior Iron Ore Association. Shipments totaled 80,928,808 tons compared with 75,504,765 tons in the 1947 season.

The Mesabi range alone accounted for 63,058,862 tons, or 76.80 per cent of the total in 1948 against 75.11 per cent in 1947. Percentages recorded in 1948 and 1947, respectively, for the other ranges were as follows: Gogebic, 6.39 and 6.74 per cent; Marquette, 5.92 and 6.99 per cent; Menominee, 4.76 and 4.42 per cent; Cuyuna, 2.91 and 2.98 per cent; Vermilion, 1.79 and 1.67 per cent; Steep Rock, 0.82 and 1.54 per cent; Michipicoten, 0.61 and 0.55 per cent.

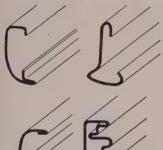
Total shipments by grades in tons and per cent of total were as follows for United States ranges: Nonbessemer, 65,620,798 tons, 79.92 per cent; Bessemer, 12,304,266 tons, 14.99 per cent; manganiferous, 2,650,069 tons, 3.23 per cent; and siliceous, 353,675 tons, 0,43 per cent. All of the Canadian ore shipments were of the bessemer grade.

U. S. Buys Madagascar Graphite

Washington—Sale of 19,800 tons of Madagascar graphite to the United States government by French suppliers has been announced by ECA. Economic Cooperation Agreement of June 28, 1948, between the United States and France—calls for the export of graphite to the United States at a maximum annual rate of 3,000 metric tons. Madagascar graphite is preferred for lining crucibles used in making steel castings for ships and for retorts used in zinc recovery.

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Warehouse . . .

Warehouse Prices, Page 155

Boston—Although demand for steel out of warehouses is slower, inventories of carbon products, excepting cold-finished bars, lack balance. Demand for galvanized sheets is far in excess of supply, same applying to most other grades of fiat-rolled, structurals, plates and hot-rolled carbon bars. Effect of withdrawals from this territory by some mills is still a factor in warehouse distribution, latter being unable to make connections for replacement of tonnage lost.

Philadelphia — District jobbers report a decline in January shipments, with a further reduction likely in February. Distributors could do a much heavier business in the carbon grades if only more steel were available. Meanwhile, there have been some further slight adjustments in prices, with hot-rolled bars off five cents per hundred pounds to 5.55c for city and 5.40c for country delivery. Floor plates appear to have leveled off to 6.74c for city and 6.59c for country. Hot-rolled strip, on the other hand, is higher at 5.60c city and 5.45c country.

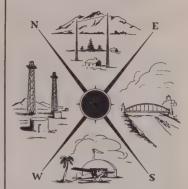
Cincinnati — Warehouse trade enters February with a pattern set in January, inquiries slackening but the supply in most lines of steel inadequate for needs. Deliveries sagged a bit last month because of slowing mill replacements to stocks.

Los Angeles—Steel jobbers in this district report demand on the average is off 15 to 20 per cent from the November-December level. Although new orders have remained fairly steady in volume, there is pronounced shrinkage in size. Warehousemen are not pessimistic, however, some feeling that requirements of their customers will either stabilize at present levels, or possibly tend slightly upwards over the next few months. In the meantime, warehouses are able to fill orders more generously, both as to variety and quantity. Receipts from mills are considerably improved, and inventories in many cases have increased. Supplies are better in structural materials, stainless, alloy bars, and cold-finished carbon bars.

San Francisco — Jobbers are showing uncertainty and greater caution in assaying future trends. Reduced buying by smaller fabricators has accentuated unbalance in some warehouse inventories. Large users are sustaining demand, and overall volume is down only slightly. Prices show no change, and scarcity continues in most popular items.

Seattle — Jobbers have had a poor month compared to a year ago. There is less demand from small shops where demand is definitely slackening off. Jobbing stocks are slightly improved, due in some measure to retarded deliveries on account of the weather, but they are still far from normal. Plates and sheets, particularly hot rolled, continue in strong demand and short supply. Nails are somewhat easier. Alloy stocks are fair, but mill deliveries are still three to four months. Supplies from eastern plants are generally coming by water again, although finished products and high grade steel are shipped by rail on which items there may be a price readjustment soon.

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Scrap . . .

Undertone of market continues weak with still lower prices expected

Scrap Prices, Page 158

Philadelphia — Scrap prices continue to decline, with No. 1 heavy melting steel now quotable at \$40 to \$40.50 and No. 2 heavy melting, No. 1 busheling and Nos. 1 and 2 bundles at \$37.50 to \$38, delivered. These revisions are based principally on latest offerings of sellers, as consumers still are showing little buying interest.

Machine shop turnings and mixed borings and turnings have declined \$3 to \$31 to \$32, delivered, and short shovel turnings are off \$1.50 to \$34.50 to \$35.50. Bar crop and plate, punchings and plate scrap, and cut structurals have dropped to \$42 to \$43 and electric furnace bundles to \$41 to \$42. Heavy turnings are off \$3 to \$39 to \$40. Charging box cast and heavy breakable are now holding at \$44 and \$45, delivered, respectively, and No. 1 wheels at \$52 to \$53, a decline of \$4 in each case. Other grades are unchanged, with No. 1 cupola cast at \$50.

New York — Scrap brokers, in an effort to wind up old contracts on schedule and thus avoid cancellations of unshipped tonnage, continue to maintain prices on the major openhearth grades. Meanwhile, new orders for these grades are negligible. Brokers have further reduced prices on machine shop turnings and mixed borings and turnings and short shovel turnings and turnings to \$27 to \$28, f.o.b. shipping point, and short shovel turnings to \$28 to \$29. Low phos scrap also has been marked down sharply, with punchings and plate scrap, cut structurals and electric furnace bundles now at \$39, f.o.b. shipping point. No, 1 cupola and charging box cast have been reduced \$4 a ton to \$45 and unstripped motor blocks to \$42.50. Heavy breakable is unchanged at \$40. Malleable is nominal, with supply scarce and, at the moment, few price offerings.

Pittsburgh - Scrap quotations are considered nominal, since the market was devoid of new purchases up until late last year, for open-hearth, turnings and cast scrap grades. There are some old orders still outstanding for open-hearth grades, but the new prices are expected to be \$1.50 to \$2 lower than the last reported purchase of No. 2 dealer scrap at Similarly consumers are out of the market for short shoveling turnings, with quotations also expected to be below last purchase price of \$35.50. Some consumers have contracts still outstanding for turnings at \$38 and are releasing shipments slowly. Further weakness in cast scrap is in evidence with rumored sharp reductions in offering prices. Market remains nominal in absence of any new buy-ing. Some authorities expect scrap quotations will be officially estab-lished at lower levels on purchases this week, although on basis of ample consumers' inventories there is no pressure for mills to re-enter the market throughout this month.

Weakness in scrap was expected to be reflected in awards of railroad lists late this week. Brokers' bids for railroad heavy melting ranged beHave you considered how this man can lower the cost of your springs?



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Detroit - Judging the scrap market at the moment is just a question of how bearish the dealer or broker interviewed is inclined to be. rent broker's buying price of \$32.50 to \$33 for open-hearth material is pretty close to the picture, the latest sale to a local mill being at \$34, delivered. More lists of "free" scrap are being issued. Fisher Body sold all its plate scrap, formerly allocated to mills and is understood to have received slightly more than the old mill price because it went as electric furnace material. Buick offered 600 tons of plate scrap plus a tonnage of turnings on the open market. There is an impression among some brokers that steel mills are overstating their scrap inventories purposely to drive the market down further, another \$5 drop being considered not unlikely. They fail to understand how inventories, at one time stated to be only 30 days, could almost overnight become stretched to the present three or four months, in the face of virtually 100 per cent operations. Inquiries for cast scrap are practically nonexistent and prices at best nominal.

Cleveland-Scrap is moving slowly in this district with prices unchanged on the basis of \$37 to \$37.50 for open-hearth grades, \$31.50 to \$32 for machine shop turnings, and \$43 to \$44 for low phos grades. Undertone of the cast iron scrap market remains weak, but no sales have been reported under \$60 to \$61. Mills here are in a comfortable stock position, averaging from 45 to 60 days' needs, and have no immediate plans for re-entering the market actively.

Buffalo - Weakness dominated the scrap market last week with prices falling an additional \$1 to \$2 a ton. Markets were quoted virtually on an entirely nominal basis as buying interest reached a low ebb and dealers continued to shave offering prices. No. 2 heavy melting steel declined to a range of \$38 to \$38.50 a ton, but no buyers appeared. A bid of \$35 was rumored, but unconfirmed, as being placed by a leading mill. In addition a top consumer slashed its contract price for earmarked scrap 75 cents a ton.

Mills reported substantial stock-piles to support their sideline stand until the price decline shows signs of leveling off. Foundries also were limiting their purchases with prices on the weaker side. A sale of top quality cast to an outside consumer at \$55, f.o.b. Buffalo caused some comment. No. 1 cupola was quoted as

low as \$51.

Chicago -- Inland and Carnegie-Illinois made brief forays on the scrap market last week and came out with dealer open-hearth scrap at \$35 and industrial material at \$37. Rerolling rails were also bought, \$50 being the price. The purchases were so light however, the trade generally continues to assert there actually are no quotable prices which are repre-sentative of the market, and more and more buying in more grades will be necessary before the picture is clarified. Mills continue comfortably fixed and the Carnegie purchase came as somewhat of a surprise since the company had only recently indicated it would





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probably not place any new orders for dealer material this month. Foundry purchases are extremely limited and further price reductions may not materially increase demand.

Cincinnati—Buying interest in scrap receded further last week. Most open-hearth grades held at recent prices in a weak market while cast grades continued the downtrend. Major buying by melters was absent, and the spotty, light deals proved the lowered quotations. Considerable tonnage was being rushed in fulfillment of contracts at higher than current levels.

Birmingham—Scrap market continued weak here last week, although quotations, except on No. 1 cupola cast and stove plate, remain unchanged. Heavy melting continues at \$35. Brokers describe the cupola and stove plate prices as nominal, although they cite \$48 to \$50 on the former and \$42 to \$43 on the latter as "best guesses."

Dallas—Scrap prices in Dallas have dropped 30 per cent on steel and about 50 per cent on cast in the past two weeks. Open-hearth No. 2 is down \$7 to \$8. Cast iron is practically at a standstill at about \$20 a ton under two weeks ago. Dealers are paying \$18 to \$20 a ton for steel scrap, Dallas. Prolonged and unusually cold weather for this section together with the price drop is materially reducing supplies at yards.

St. Louis—Scrap offering prices weakened sharply again last week as two major consumers, who have been out of the market a month or more, announced they would remain out at least another 30 days. An influx of offerings from distant points was an important factor. There is no established price level for any scrap grade and reputed offering levels may vary \$6 to \$8 dollars on the same item, depending on the position of the individual dealer. Last substantial sale of No. 1 heavy melting steel, for example, was at \$39 three weeks ago, but mills have been offered some at \$35 and could obtain 50,000 tons at \$37 to \$38. Railroad grades were off especially sharply last week with only one list coming out, and that at an undisclosed price. Bundles and turnings, normally in light demand, in this market, are going begging.

Los Angeles — Although quota-

Los Angeles — Although quotations for steelmaking scrap are unchanged, the prevalent feeling is that sooner or later they will follow the decline of scrap prices in eastern centers. Meanwhile, collections have fallen off, with mills quickly absorbing whatever tonnages are available.

San Francisco — Prices on steel scrap are holding steady, although undertone of cast iron is weak. Major users differ on future supply prospects, some believing shortage on West Coast will become acute by midsummer, while others foresee no serious difficulty in obtaining needs.

Seattle—Although there is a weakness in the steel scrap market, mills are still paying \$30, f.o.b. plant, for unprepared and \$33,50 for prepared. Receipts continue in larger volume, ship scrap being of importance. Much of this material has been in storage awaiting a turn in the market. Mill price for cast iron scrap is \$35, but foundries report their level is \$40 for truck delivery, \$45 by carload.

Steelmaker Protests Tax Hike

Pittsburgh — Steadily rising taxes on steel producers' primary production facilities and machinery are arousing increasing concern among steel industry officials. If the upward trend continues, it is said, it conceivably could figure in decisions reached with respect to the relocation of some facilities, or the geographical location of new mills, etc.

Recentily the Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, appealed a \$46 million increase in machinery assessments by the Allegheny County, Pa., Tax Board. The increases in assessments will raise the company's tax cost per ingot ton of capacity from 48 to 65 cents in contrast with comparable cost at some seaboard points of about 20 cents, thus placing the company at a further competitive disadvantage.

Steel Window Well Prices Cut

St. Paul — A drastic price reduction in the cost of steel window wells (areavalls) for basement window openings was made effective as of Jan. 15 by the Saint Paul Corrugated Co., this city. The reduction is based on "substantial deliveries of steel from regular mill suppliers," and a rearrangement of production facilities, bringing about straight-line production, and important economies in manufacturing operations.

The price reduction varies accord-

ing to the size.

Structural Bookings Increase

New York — Estimated structural bookings last year totaled 1,965,769 tons, the largest since 1930, with the exception of 1941 when the industry booked 2,296,954 tons. Last year's bookings, according to the American Institute of Steel Construction, were 20.6 per cent greater than the volume contracted for in 1947, and were 3.2 per cent above the average bookings of the five prewar years, 1936-1940. Shipments last year totaled 1,993,902 tons or an increase of 4 per cent over 1947 and 36 per cent over the average of the five prewar years.

Backlog tonnage as of Jan. 1 and for the succeeding four months amounted to 669,651 tons against 671,091 tons at the beginning of 1947. Contracts closed in December amounted to 169,553 tons, against revised figures for November and October of 140,794 and 162,739 tons, respectively. December shipments were 182,370 tons, compared with revised figures for November and October of 169,796 and

164,024 tons, respectively.

Canada . . .

Toronto—Pig iron production in Canada amounted to 166,771 net tons in November, or 73.9 per cent of capacity compared with 186,424 tons or a rate of 79.9 per cent, in October and 174,147 tons, or 77.2 per cent for November, 1947. Output of ferroalloys in November amounted to 17,594 tons against 19,489 tons in October. Production of steel ingots and castings amounted to 277,978 tons in November compared with 281,866 tons in October.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3200 tons, apartment, Uris Bros., 52nd St. and Madison Ave., New York, to Harris Structural Steel Co., that city.

1920 tons, boiler house and boiler supports, San Francisco, to Consolidated Western Steel Co., Los Angeles.

1140 tons, Seattle branch, Federal Reserve Bank, to Bethlehem Pacific Coast Steel Corp., Seattle.

925 tons, Board of Transportation bus garage, Castleton Ave., Staten Island, New York, to Lehigh Structural Steel Co., Allentown, Pa.

800 tons, two additional roadways, Philadelphia-Camden bridge, through Kaufmann Construction Co., Philadelphia, to Harris Structural Steel Co., New York; 900 tons of flooring steel is reported placed with another interest.

666 tons, Army barracks near Fairbanks, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract held jointly by Peter Kiewit Sons' Co. and Morrison-Knudsen Co. Inc.

600 tons, building, Sandoz Chemical Co., East Hanover, N. J., to Bethlehem Steel Co.

375 tons, state bridges, Middlesex county, New Jersey, through Villa Contracting Co., Westfield, N. J., to Bethlehem Steel Co.

350 tons, boiler supports, Foster-Wheeler Co., Sunbury, Pa., to Bethlehem Steel Co.

300 tons, garage and service building, Manhattan-Pontiac, 11th Ave. between 49th and 50th Sts., New York, through Schnermacker Bros. Inc., to Grand Iron Works, that city.

300 tons, Hebrew Home for Aged, Kingsbridge Road, Bronx, New York, to Grand Iron Works, that city.

275 tons, Mt. Carmel school, 188th St. and Bathgate Ave., Bronx, New York, to Grand Iron Works, that city.

250 tons, Board of Transportation bus garage, Brook St., Staten Island, New York, Schacht Steel Construction Inc., that city.

200 tons, section of state turnpike, Lancaster county, Pennsylvania, to Bethlehem Steel Co.

170 tons, building, Norristown, Pa., to Bethlehem Steel Co.

160 tons, store building, West Hempstead, Long Island, through J. J. Dixon, to August Bellon, Rockaway Park, Long Island.

150 tons, patients building, state hospital, Wernersville, Pa., through Potteiger, Reading, Pa., to Reading Metalcraft Co., that

125 tons, Gansevoort market, New York, to Grand Iron Works, that city.

STRUCTURAL STEEL PENDING

6000 tons, state turnpike bridge, near Steelton, Pa.; plans expected out for bidding late in February.

3870 tons, structural steel for tunnel support, Corps of Engineers, Garrison district, Bismarck, N. Dak.; bids Feb. 15.

2700 tons, building, Veterans Administration, Indianapolis; bids asked.

1800 tons, single circuit steel towers for Olympia-Covington transmission line, Bon-Isaacson Iron Works, Seattle, apparently low, \$524,683, f.o.b. destination; American Bridge Co., \$474,683, f.o.b. Pittsburgh.

1500 tons, Federal Accounting building, Washington; John McShane, Philadelphia, low on general contract. Plans for H-piling foundation construction, which would have required 8000 tons of steel, have been dropped.

850 tons, office building, Pearl and Trumbull Sts., Hartford, Conn.; bids Feb. 7.

700 tons, textile plant, New London Mills, New London, Conn.; Fletcher- Thompson Co., New Haven, engineer.

580 tons, two overpasses, state Van Wyck expressway, Long Island; bids asked.

500 tons, warehouse, Owens-Illinois Glass Co., Toledo, O.; bids Feb. 15.

400 tons, Woolworth store, Hempstead, Long Island; bids asked.

240 tons. Glen Oaks shopping center, Melrose,



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- Long Island, Blitman Construction Co., 101 Park Ave., general contractor.
- 200 tons, 15 motor vehicle garages, Corps of Engineers, New England points.
- 180 tons, bakery and garage, Philadelphia; bids in.
- 155 tons, State St. bridge and retaining walls, Trenton, N. J.; bids Feb. 10, Trenton.
- 155 tons, state bridge work, Trenton, N. J.; bids Feb. 10.
- 150 tons, Harleysville Mutual Insurance building, Harleysville, Pa.; bids Feb. 8.
- 100 tons, veterans housing project, Wilmington, Del.; bids postponed until Feb. 8.
- 100 tons, shop buildings, U. S. Gypsum Co., Boston.

REINFORCING BARS . . .

REINFORCING BARS PLACED

- 2000 tons, housing project, South Boston, Mass., to Webrib Corp., New York; John Bowen Co., Boston, general contractor.
- 800 tons, housing project, Manchester, N. H., to Webrib Corp., New York; Gilbane Construction Co., Providence, R. I., general contractor.
- 250 tons, shop building, General Electric Co., Lynn, Mass., to Bethlehem Steel Co.; Thompson-Starrett Co., New York, general contractor,
- 200 tons miscellaneous state bridges, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

- 8000 tons, Federal Accounting building, Washington; John McShane, Philadelphia, low on general contract.
- 510 tons, addition, Montgomery, Ward & Co., 619 Chicago Ave., Chicago; bids asked.
- 450 tons, approx., store addition, Wieboldt's, River Forest, Ill.; bids asked.
- 330 tons, apartment buildings, 1350 Astor St., Chicago; bids asked.
- 200 tons, dam, flood control project, Corps of Engineers, Springfield, Mass.
 140 tons, State St. bridge and retaining wall,
- Trenton, N. J.; bids Feb. 10, Trenton.

 138 tons, laboratory, Hammond, Ind., Stand-
- ard Oil Co. of Indiana; bids in Jan. 25.
 Unstated, 146-foot reinforced concrete Oregon state bridge, awarded VaDare Construction
- Co., Portland, \$36,680. Unstated, Federal Reserve Bank building, Seattle; bids Feb. 23 to Naramore, Bain, Brady & Johanson, architects, Seattle.
- Unstated, concrete steel siphon and grade separation, Portland, Oreg.; general contract to C. M. Halvorson, Portland, low, \$526,-131.

PIPE . .

CAST IRON PIPE PLACED

824 tons, 4 to 12-inch water mains, for Seattle, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

375 tons, 8 and 12-inch water mains, for Portland, Oreg.; American Cast Iron Pipe Co., Birmingham, low.

STEEL PIPE PENDING

- Unstated, 12,740 feet 3/16th, 28-inch diameter, water supply pipe and appurtenances; bids to E. H. T. McGowan, city clerk, Bremerton, Wash., Feb. 9.
- Unstated, 13,000 feet 4 and 6-inch water mains, for local District No. 2, Bremerton, Wash., alternate for wood; bids in Feb. 8.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian Pacific, 400 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILS PLACED

Atlantic Coast Line, 53,000 tons, with 27,000 going to the Bethlehem Steel Co. and 26,000 to the Tennessee Coal, Iron & Railroad Co., Birmingham.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

- FRESNO, CALIF.—Drake Steel Supply Co. has completed a \$50,000 enlargement of its warehouse.
- LONG BEACH, CALIF.—Ohio Rubber Co. is building a warehouse at 6700 Cherry Ave.
- LOS ANGELES—Pax Metal Corp. has been formed with a capital of \$500,000, to engage in general metals manufacturing, fabricating, machinery and supply business. Principals are Ben Koenig, Norman Brand and Olive E. Wood, all of Los Angeles. The new corporation is represented by Norman Brand, 1680 N. Vine St., Hollywood.
- LOS ANGELES—Rapid Wire Products Inc. has been formed with a capital of \$25,000, to manufacture steel wire products and other metal products. Principals are Julius L. Swartz and J. Elliott Swartz, both of Los Angeles; and Herbert Magidson, W. Los Angeles. The new corporation is represented by Joseph Friedman, 1117 Garfield Bldg.
- LOS ANGELES—Miller-Robinson Co. is expanding its plant at 7007 Avalon Blvd., and will increase its facilities for manufacture of pneumatic powered pruning equipment and agricultural hand tools.

ARIZONA

PHOENIX—Pacific Greyhound Bus Lines plans a \$750,000 bus depot; plans by H. H. Green, Security Bldg.

FLORIDA

- JACKSONVILLE, FLA.—Sinclair Refining Co., Talleyrand Ave., plans to build a \$500,000 oil terminal on St. Johns River.
- WINTER HAVEN, FLA.—B. C. Skinner Machinery Co., Dunedin, has awarded a \$700,-000 contract to Adams Packing Association, for construction of a frozen citrus concentrates unit plant.

ILLINOIS

- CHICAGO—Chicago Carton Co., 4200 S. Pulaski St., plans to build a \$2.5 million plant; plans by Westcott Engineering Co., 205 W. Wacker Dr.
- GRANITE CITY, ILL.—Granite City Steel Co, will build \$250,000 fly-ash precipitators for four smokestacks at the plant's power house; Peter Lottus Co., 610 Smithfield St., Pittsburgh, consulting engineer.

INDIANA

EAST CHICAGO, IND.—Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, has awarded a \$5 million contract to Aetna Standard Engineering Co., Home Savings & Loan Bldg., Youngstown, for erection of a mill.

IOWA

DES MOINES, IOWA—Wood Bros., 1700 E. Aurora St., plans a \$1 million factory expansion.

LOUISIANA

- BATON ROUGE, LA.—Louisiana Electric Cooperative Inc., plans to build electric generating power units to cost \$3,242,000.
- BOGALUSA, LA. Gaylord Container Corp. plans a \$2 million bag plant.
- DE RIDDER, LA.—Louisiana Electric Co-operative Inc. will build \$2.5 million electric generating power units.
- FARMERVILLE, LA.—Louisiana Electric Cooperative Inc. plans to build electric generating power units to cost \$2,285,000.
- NATCHITOCHES, LA.—Louisiana Electric Cooperative Inc. plans to build electric generation power units to cost \$5,570,000.

MISSOURI

KANSAS CITY, MO. — Kuhlman Diecasting Co., 5111 E. 24th St., plans a \$120,000



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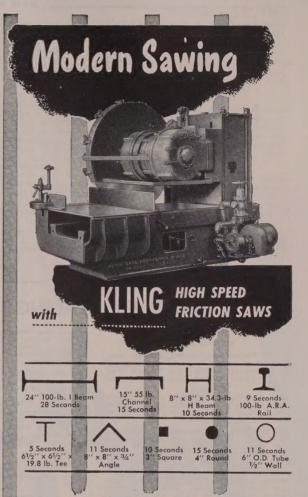
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ASSEMBLING

plant; plans by B. A. Larson, 216 LaSalle Bldg., 8 East Ninth St.

NEW JERSEY

CLIFTON, N. J.—Allen B. DuMont Laboratories Inc., 2 Main Ave., Passaic, will build a \$500,000 tube plant.

TEXAS

HOUSTON, TEX. — National Steel Products Co., 1901 Franklin St., plans to build a \$750,000 steel fabricating plant and a \$275,-000 warehouse; engineering department, Weirton Steel Co., Weirton, W. Va., engi-

CANADA

- ATIKOKAN, ONT.—Steep Rock Mines Ltd., 25 King St. W., Toronto, plans to spend over \$5 million on ore deposit developments near here.
- CHATHAM, ONT.—Ontario Steel Products has awarded a \$200,000 contract to W. L. Green & Son, Gladstone Ave., for a factory addi-
- HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., 286 Sanford Ave. N., is planning to build a warehouse and office and a ga-

rage to cost \$1,300,000; plans by W. R. Sauter & Assoc., 36 James St. S.

- HAMILTON, ONT. Canadian Westinghouse Co. Ltd., 286 Sanford Ave. N., is contem-plating constructing a \$1 million steel plant including power house and locker room on Beach Rd.; plans by Prack & Prack, 310 Main St. E.
- HAMILTON, ONT. International Harvester Co. of Canada Ltd., Sherman Ave., has awarded a \$100,000 contract to Cooper Construction Co. Ltd., Medical Arts Bldg., Hamilton, for a factory extension; architect, J. D. Kyles, 1104 Pigott Bldg.
- LINDSAY, ONT.—Brinton-Peterborough Car-pet Co. Ltd., Cambridge St. W., has award-ed a \$250,000 contract to Eastwood Construction Co. Ltd., 356 George St. W., for a factory addition.
- MARATHON, ONT.—Marathon Paper Mills of. Canada Ltd., 321 Bay St., Toronto, plans to make improvements at its sulphite mill at a cost of \$1,500,000.
- TORONTO, ONT.—Zanogen Steel Co. of Canada Ltd., 34 Briton St., has awarded a \$100,000 contract to Jackson Lewis Co. Ltd., 80 W. King St., for construction of a factory; N. A. Armstrong, 19 Melinda St.,

- ASBESTOS, QUE. Shawinigan Water of Power Co. Ltd., 600 Dorchester St., ha awarded a \$175,000 contract to Shawiniga. Engineering Co. Ltd., 600 Dorchester St. W., Montreal, for construction of a substation; J. A. McCrary, chief engineer.
- GRANBY, QUE.—Granby Canton Agricultura Co-operative, c/o A. Deslauriers, architect plans to spend \$300,000 on cold storage and heated warehouses.
- MONTREAL, QUE. International Paint Ltd., 6700 Park Ave., plans to build a \$300,000 factory addition; architect, J. C Meadowcrott, 1154 Beaver Hill Sq.
- MONTREAL, QUE.—Rupertsland Trading Co Ltd., 14 Main St., Winnipeg, Man., ha awarded a \$500,000 contract to Foundation awarded a sonotole canada to Co. of Canada Ltd., 1900 W. Sherbrook St., for erection of a warehouse and office at St. Alexander St.; Moody & Moore, 29: Broadway, Winnipeg, Man., architects.

MEXICO

MEXICO CITY—Cables, Conduits & Fittings Ltd., St. Jean, Que., plans to build a \$3 million electric supply factory.

PRICES OF LEADING FERROALLOYS PRODUCTS

(Continued from Page 155)

SILICON ALLOYS

25-36% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Sl; packed 19.90c; ton lots 21.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices. 75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices. 90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.90c per lb of alloy, ton lots packed 10.3c, 200 to 1999 lb 10.65c, smaller lots 11.15c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00e per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c, Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c, per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered, Add 0.25c for notching small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9e per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, \$1.40 per lb of contained Ti; less ton \$1.45. (Ti 35-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot \$1.28, less ton \$1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, \$160 per net ton, f.o.b. Ni-agara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Mcdium-Carbon: Ti 17-21%, C 3-4.5%). Contract, \$175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, \$2.90 per lb of contained Va. Delivered. Spot. add 10c. Crueble-Special Grades (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), \$3. Primos and High Speed Grades (Va 35-55%, Si 1.50% max., C 0.20% max.), \$3.10.

Vanadium Oxide: Contract, less carload lots, \$1.20 per lb of contained V₂O₆, freight al-lowed. Spot, add 5c. Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c, freight allowed.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, \$2.25 per lb of contained W; 2000 lb W to 10,000 lb W, \$2.35; less than 2000 lb W, \$2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, \$2.90 per lb of contained W; less than 1000 lb W, \$3.

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 3.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy. ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, \$1.20 per lb of alloy. Less than 100 lb \$1.30. Delivered, Spot, loy. Ladd 5c.

Boresil: (3 to 4% B, 40 to 45% Si), \$6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium

OTHER FERROALLOYS

Ferrocolumblum: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, \$2.90 per lb of contained Cb, less ton \$2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-69, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 55-40%, Ca 9-11%, Al 6-8%, Zr 3-5-%, Ti 9-11%, Boron 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, 4" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered. Spot, add

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%), C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of \$3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; \$65 per gross ton.

Ferromolybdenum: (55-75%), Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity \$1.10.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.